

# **ENVIRONMENTAL ASSESSMENT**

USDA Forest Service

Eiler Fire Salvage and Restoration Project

Hat Creek Ranger District, Lassen National Forest

Lassen County, California

## **Chapter 1: Purpose, Need, and Proposed Action**

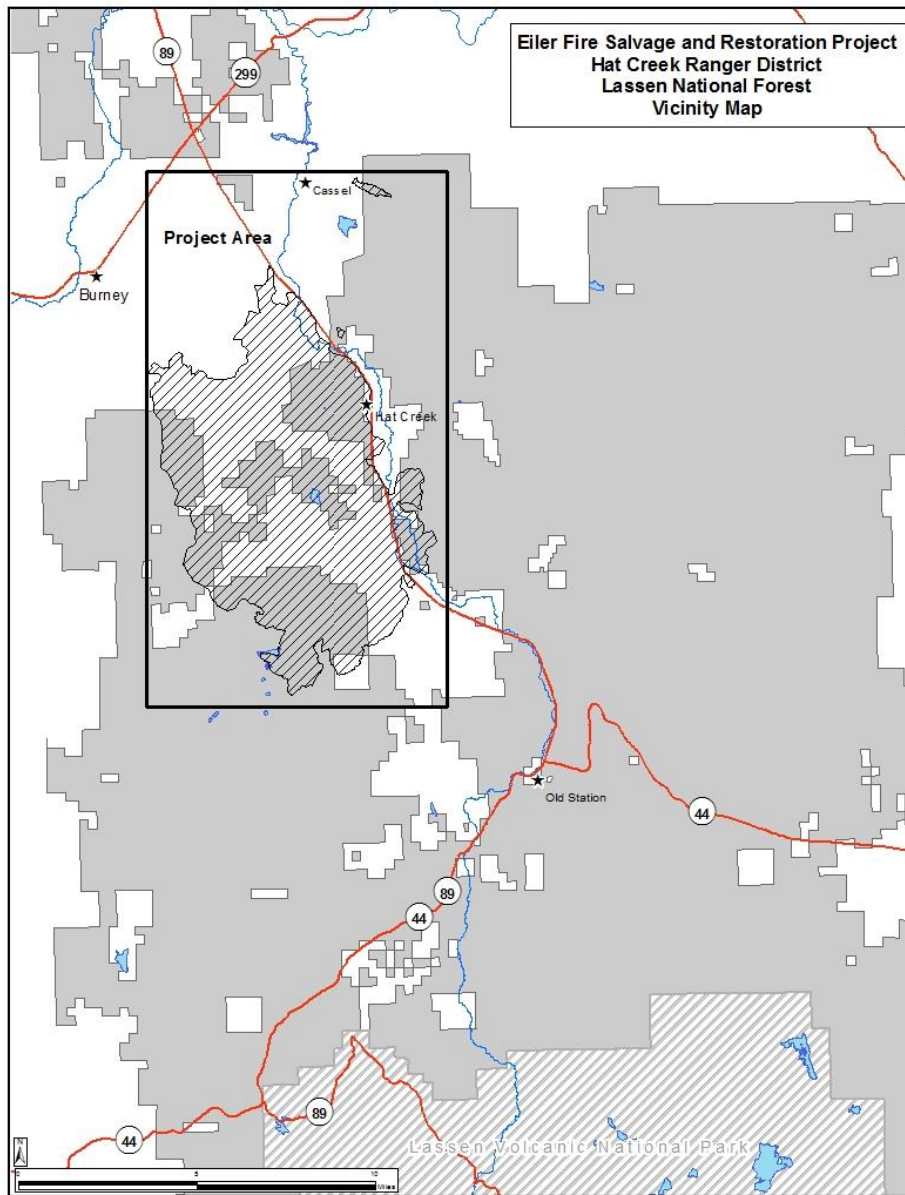
### **Introduction**

The Forest Service is proposing to take management action to respond to conditions created by the Eiler Fire, which burned approximately 14,926 acres of National Forest System (NFS) lands on the Hat Creek Ranger District of the Lassen National Forest (LNF) during July through October 2014. Objectives for responding to the effects of the Eiler Fire include reducing safety hazards along roads and trails and at trailheads and recreation sites, as well as in the treatment areas, recovering the value of fire-killed trees, reducing the danger and difficulty of suppressing future wildfires, and re-establishing forested conditions and habitats in burned forest stands.

Salvage logging would be the first step in the process to capture the economic value of hazard trees and dead trees, which pays for their removal from the forest and potentially for other future restoration treatments. Post-fire management treatments are generally focused in areas that experienced moderately high to very high vegetation burn severity effects. Road accessibility and economic considerations also shaped the design of the project.

The Lassen National Forest was granted an Emergency Situation Determination (ESD) on May 13, 2015 for the actions proposed for the Eiler Fire Salvage and Restoration Project (Eiler Project). The ESD allows salvage harvesting and hazard tree removal activities under the Eiler Project to begin in early July 2015. Local timber industry representatives have expressed interest in the project provided salvage harvest and hazard tree removal operations can be completed by the end of the 2015 field season. In addition, implementing the project in 2015 would result in the least economic losses to the government due to less timber deterioration, thereby allowing the Forest Service to effectively conduct the restoration work associated with removing the burned timber. A portion of the value from the timber sales will be used to fund the proposed reforestation work. Finally, implementation of the Project in 2015 would address hazards to human health and safety within the project area at the start of the summer season, when this area receives its highest levels of human use.

## Project Area



**Figure 1. Eiler Project Vicinity Map**

The Eiler Project is located approximately five miles southeast of Burney California, west of State Highway 89, east of Burney Mountain, south of Brown's Butte, and north of the Thousand Lakes Wilderness. Legal locations for the Eiler Project include portions of Township (T) 33 North (N), Range (R) 3 East (E), Sections 1 and 2; R4E, Sections 16-18; T34N, R3E, Sections 10, 11, 13-15, 22-24, 26, 34-36; R4E, Sections 4, 5, 7-10, 15, 17-23, 26-28, 30-32, 35; and T35N, R4E, Section 32, in Shasta County, California. Map 1 in Appendix A shows the general location of the Eiler Project relative to the LNF boundaries and nearby communities. The project area is located in the Logan (MA 9), Thousand Lakes

(MA 15), and Hat Creek (MA4) management areas as identified in the LNF Land and Resource Management Plan (LRMP). There are approximately 18,080 acres of privately owned land, and 156 acres of other federally owned land within the Project Area.

### *Relationship to Bald Fire*

The lightning ignited Bald Fire started a day before the Eiler fire on July 30, 2014, and burned a total of 39,419 acres, 31,419 of which were on NFS lands, before being controlled on September 15, 2014. The Bald Fire was located nine miles east of the Eiler Fire. Although the Bald and Eiler fires burned at the same time and affected the same local communities, the fires affected separate watersheds so any environmental effects from the fires will be analyzed in two separate projects (Figure 2).

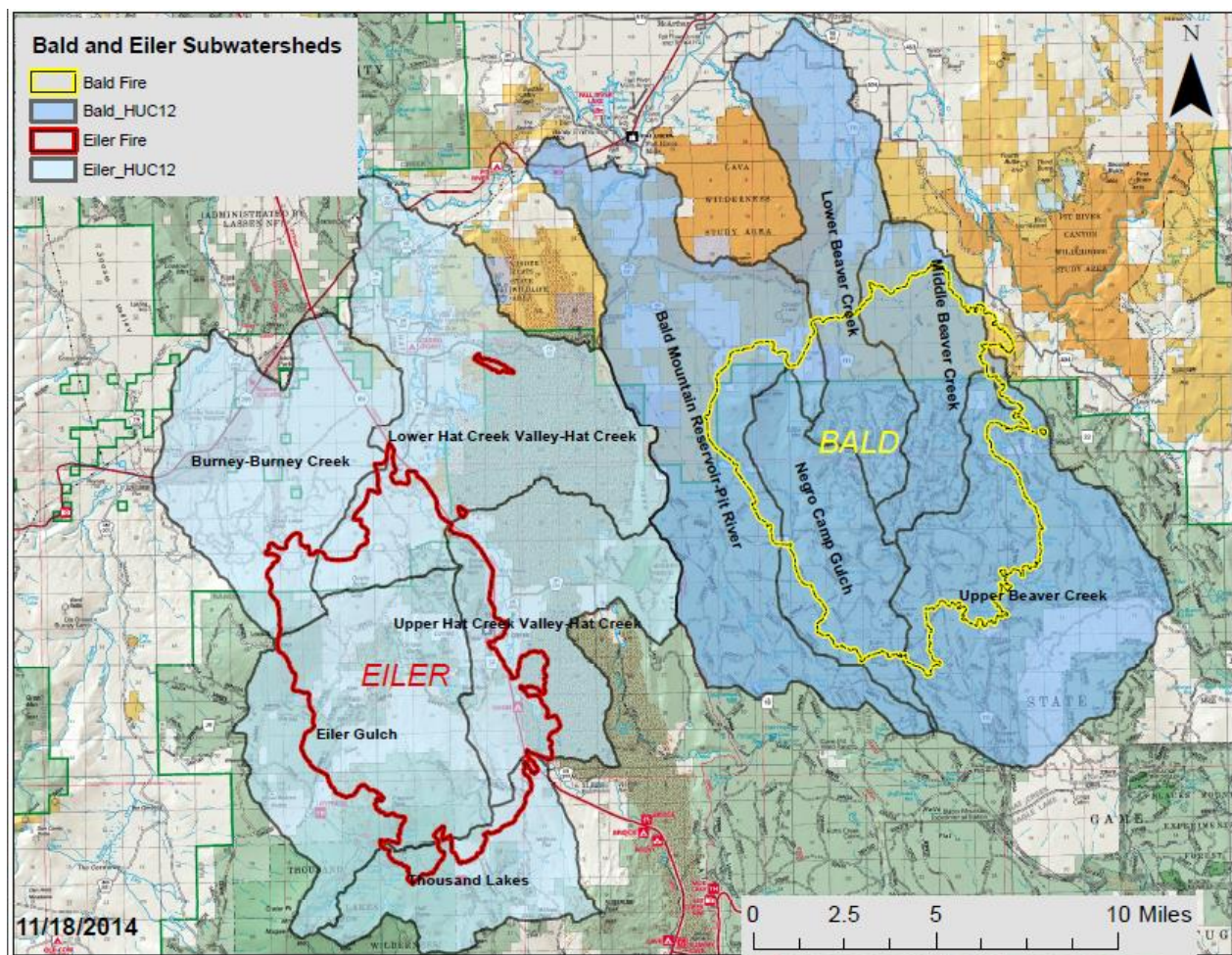


Figure 2. Eiler and Bald Projects Affected Watersheds.

## Background

The Eiler Fire started on July 31, 2014, in the Thousand Lakes Wilderness and burned in a northerly direction before it was contained on October 3, 2014; the cause is still under investigation. The fire burned approximately 33,162 acres of NFS and private land. The fire resulted in a mosaic of vegetation burn severity effects (based on basal area tree mortality) (Figure 3). The Eiler Fire Salvage and Restoration Project Photo Appendix (hereby incorporated by reference, located in the Eiler Project Record) shows the post-fire conditions of the project area. There are areas where tree mortality is 100 percent while other areas still support a green tree component. Table 1 summarizes the percent of the area burned by severity class. Generally, the lower to moderate burn severity effects are found on the outer edges of the fire with an average patch size of 35 acres and the high severity burn effects, which account for the majority of the burned area, are found in the center of the fire with one patch exceeding 17,700 acres, and an average patch size of 214 acres.

**Table 1. Eiler Fire Area Percent Burn Severity**

	Severity - Percent Basal Area Tree Mortality		
	Low-Moderate (less than 50%)	Moderately High (50% to 75%)	Very High (greater than 75%)
Percent of Fire Area	25%	6%	69%

**Source:** Based upon data received from the Remote Sensing Applications Center (RSAC) at Salt Lake City, Utah. The RSAC produces a suite of products using the Rapid Assessment of Vegetation Condition after Wildfire (RAVG) process following containment of a wildfire that burns 1,000 acres or more of forested National Forest System land. The LNF obtained the geographic information system (GIS) information from <ftp://fsweb.rsac.fs.fed.us/RAVG/Region5/2014/Eiler>.

A Rapid Assessment was conducted according to Region 5 protocol to provide guidance regarding salvage and reforestation potential across the affected landscape as part of a broader plan for long-term rehabilitation and restoration. An interdisciplinary team assessed the effects of the fire to develop a proposal for post-fire treatment activities based on management objectives, science, and experience. Post-fire management opportunities are generally focused in areas that experienced moderately high to very high vegetation burn severity effects in order to reduce hazards, efficiently capture commodity values, and reduce threats to valuable resources while reducing continuity of fuels and influencing long-term ecological trajectories, including tree planting and treatment of fuels and shrubs. Road accessibility and economic considerations associated with removing fire-killed trees in steep areas helped shape the design of the proposed action. Additional analyses were conducted for wildlife habitat, riparian conservation areas (RCAs), archeological sites, stand deterioration, and access. These additional analyses and public input were used to refine the proposed action.

Pertinent Forest Plan land allocations within the Eiler Fire perimeter include: Inventoried Roadless Area (IRA), northern goshawk Protected Activity Centers (PACs), California spotted owl PACs, Marten Habitat Management Area, Riparian Conservation Areas (RCAs), Wildland Urban Interface (WUI), Wilderness, General Forest, and Old Forest Emphasis Areas. Other than hazard tree felling (leaving felled trees on site), no other project activities are proposed within the boundaries of the Thousand Lakes Wilderness and the Inventoried Roadless Areas.

The Eiler Fire burned portions of the Hat Creek and Burney Creek watersheds, which are included in the Collaborative Forest Landscape Restoration (CFLR) program approved Burney-Hat Creek Basins project. The Burney-Hat Creek Basins restoration project is designed to increase the resiliency<sup>1</sup> of the landscape, reduce extreme fire risk, improve forest health and diversity to sustain habitats necessary for a variety of wildlife species, including the California spotted owl in the Burney and Hat Creek watersheds, and support the local economy.

The Eiler Fire burned in portions of the area analyzed for the Whittington Forest Health Restoration Project (Whittington Project). The information collected for the analysis of the Whittington Project provided pre-fire environmental conditions to facilitate the analysis of the Eiler Project.

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<sup>1</sup> Resiliency in this document refers to a forest that is more resilient to disease, insect infestation, fire, and climate change.

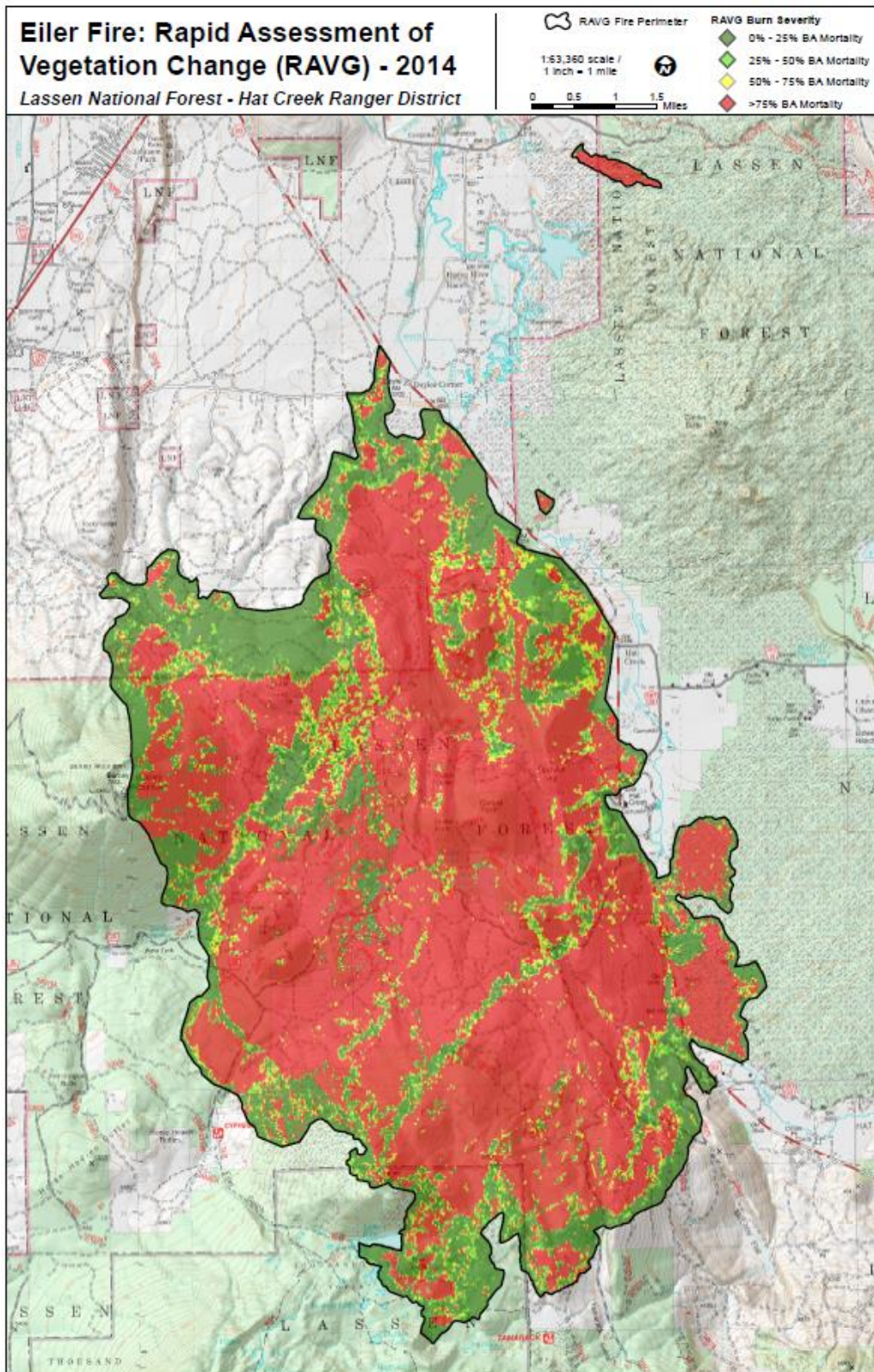


Figure 3. Eiler Fire Burn Severity based on vegetation change.

## Purpose and Need

The purpose of the Eiler Project is to:

1. Immediately reduce numerous safety hazards caused by the Eiler Fire;
2. Capture the limited, remaining forest product economic value;
3. Reduce fuel loads to adequately prepare sites for costly regeneration and reduce future loadings that create conditions prime for devastating reburns; and
4. Quickly reforest suitable portions of the landscape deforested by the Eiler Fire before these sites become fully occupied by competing vegetation.

Reforestation would expedite the beneficial re-establishment of a forested landscape capable of producing a variety of wood products, wildlife habitat, and ecological services. Delaying any of these treatments dramatically increases risk to health and safety, decreases economic benefit, and increases the cost of restoration.

## Management Direction

The Chief of the Forest Service and the Regional Forester stress that the safety of the public and our employees is our central concern. Within the transportation corridors, hazard tree management is vital to everyone's safety.

Additionally, under the Multiple-Use Sustained-Yield Act of 1960, as amended (74 Stat. 215; 16 USC 528-531), and the Forest and Rangeland Renewable Resource Planning Act of 1974, as amended [88 Stat. 476, as amended by the National Forest Management Act of 1976 (16 USC 1600-1614)], the Forest Service is authorized to sell timber and reforest National Forest System lands.

The desired conditions for the project area would be guided by the direction contained in the Lassen LRMP (1992) as amended by the Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision (ROD) (USDA 2004) and the SNFP Management Indicator Species Amendment (2007). These documents are herein referred to as the "Forest Plan". The purposes of the Eiler Project are designed in a manner that is consistent with Forest Plan direction, as described in this section.

The Forest Plan provides for ecosystem restoration following large, catastrophic disturbance events. Restoration activities may be conducted in all land allocations and include objectives for managing disturbed areas for long-term fuel profiles, restoring habitat, and recovering the economic value of some dead and dying trees. Restoration projects can include salvage of dead and dying trees for economic value as well as for fuels reduction (SNFPA ROD, pp. 4 and 6).

Standards and guidelines direct managers to design post-disturbance restoration projects to: (1) reduce potential soil erosion and the loss of soil productivity caused by the loss of vegetation and ground cover; (2) protect and maintain wildlife habitat; (3) manage development of fuel profiles over time; and (4) recover the value of timber killed or severely injured by the disturbance (SNFPA ROD, p. 52).

The desired conditions for this project are listed below:

1. Forest lands and a transportation system free of fire-affected trees or other hazards in areas of high public and administrative use;
2. Economic value of forest products recovered in a manner beneficial to local communities and forest management;
3. Surface fuel load levels that minimize high-intensity, large-scale fires within forest stands, while maintaining snags for wildlife habitat;
4. Landscapes dominated by site-appropriate trees with variable densities that contribute to a fire resilient landscape and structures that provide diverse wildlife habitat and forest products; and
5. Ecological services that provide wildlife habitat and production of forage, regulation of carbon sequestration and decomposition, support for nutrient cycling, and improvements to recreational benefits and aesthetics.

In compliance with the Code of Federal Regulations [36 CFR 220.7(b)(1) and 40 CFR 1508.9(b)], this section describes the need for the project. The needs for this project are:

**To reduce safety hazards in high use areas including along portions of National Forest System roads, trails, trailheads, and recreation sites.**

In the wake of the Eiler Fire there is an urgent need to work quickly toward reducing the numerous safety hazards in the fire affected area so that the public and Forest Service employees may travel and work without an elevated safety concern for trees that may fall or roll into the roadways, ultimately causing serious injury or death. The objective of roadside hazard tree<sup>2</sup> treatment is to reduce safety hazards along roads, particularly in those places of relatively high public use or concentrated administrative use by Forest Service employees, and to remove hazard trees within the fire perimeter. High use areas include: (1) the Hat Creek Recreation area along Highway 89 and Honn Campground, (2) forest roads that access the Tamarack and Cypress trailheads of the Thousand Lakes Wilderness, and (3) forest roads that access private timberland found within the fire perimeter. Other public use in this area includes hunting, fishing, hiking, camping, woodcutting, and sightseeing.

Treatments to remove trees that pose a safety hazard along roads are considered the highest priority. These fire-affected trees pose unacceptable risks to human health and safety with safety hazards increasing as the trees deteriorate. It is important to remove these hazardous trees in a timely, efficient, and cost-effective manner so that access to affected areas can be restored and normal Lassen National Forest operations can be fully resumed as soon as possible. Timing is of the essence in removing these hazardous trees because they are continually deteriorating. As they deteriorate, the trees become structurally weak and are prone to falling limbs, breaking apart, and/or toppling over completely. This unpredictability is a hazard to public safety on the roads.

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<sup>2</sup> A hazard tree (referred to as a danger tree in Forest Service Handbook 6709.11, Glossary) is defined as, “a standing tree that presents a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs, and the direction and lean of the tree.”

**To recover the economic value of fire-killed trees.**

Timely capture of the economic value of fire-killed and fire-damaged trees through removal is critical to achieve the desired conditions of areas free of fire caused safety hazards, benefits to local communities and forest management, re-establishment of a forested landscape, and reduction of fuels. While not all dead trees would be salvaged within the proposed salvage treatment units, safety hazards to work crews conducting fuels reduction, site preparation, tree planting, and follow-up tree release treatments would be substantially mitigated by salvage tree removal. The value of these trees is short lived, and it will continue to decline over time, as the diameter size necessary for a tree to have economic value increases over time.

In the short-term, there is a financial incentive for private companies to remove fire-affected trees, but as time passes and the trees deteriorate, that incentive decreases because the removal costs become more than the value in the timber. Substantial loss of economic value to the Federal Government from deterioration of the fire-affected trees occurs as implementation is delayed. Timing of implementation is critical to capture the window of opportunity for recouping enough value from the material removed to pay for its way out of the woods. Delaying for even one operating season would potentially diminish the economic value to a point of jeopardizing recovery of any economic value at all. Deterioration increases quickly with time which drastically reduces merchantable volume, lumber quality, and value. If the dead trees are left on site they would eventually fall, so the future fire hazard and fire severity would be increased due to the increased surface fuel load of large diameter wood that would cover this vast area. Future removal of the down material, if desired, would be very difficult, costly, and time consuming.

The communities of the Hat Creek Valley, Burney Basin, and Fall River Valley, all in close proximity to the Eiler Fire, are supported by an active timber industry and wood products infrastructure. There are two active sawmills and one active cogeneration facility in Burney. A viable timber industry and wood products infrastructure greatly improves the ability to treat and manage forest vegetation in a cost-effective and efficient manner, while ensuring long-term local employment.

Restoration of a healthy forest through reforestation efforts contributes to the economic stability of local communities. A healthy and sustainable forest contributes raw logs for lumber and wood chips for energy while providing wildlife habitat, clean water, recreational opportunities, oxygen outputs, and carbon sequestration.

**To reduce surface fuel loads to levels which facilitate site preparation for planting, minimize the danger and difficulty of suppressing future wildfires, and enhance future forest resiliency.**

There is a need to prepare sites in a timely manner for reforestation and worker safety, as well as to reduce fuel loading to decrease the potential for and severity of a re-burn within plantations. Planting trees is an investment of both money and resources for the goal of reforesting a particular site. Planting trees as soon as possible after the fire would reduce the chance of sites becoming dominated by shrubs and other competing vegetation.

The Eiler Fire resulted in a significant reduction to near total elimination of surface and small understory (ladder) fuels. In the short-term, this change in fuel loading and composition is expected to reduce wildfire intensities and rates of spread for several years. However, as the standing dead trees decay and fall to the ground, these areas will become occupied by high snag densities and a complex arrangement of fallen trees, broken tops, and branches intermixed and suspended within an increasingly heavy shrub component. In the longer-term, these conditions would result in increased fuel loading and would eventually limit the ability of firefighters to safely and effectively control future wildfires, particularly in strategic locations that could be used for future fire suppression actions. If the proposed salvage and hazard tree removal activities were not implemented, the resulting high snag densities and large numbers of down logs across the project area would impede fire line construction, increase safety hazards, and increase spotting potential.

Recent evidence of wildfire control problems in previously burned areas has been documented on the Plumas National Forest by the Chips Fire, which burned in the footprint of the old Storrie Fire. Under such conditions, fire containment lines must be constructed far from the fire's edge where it is safe and practical to do so, ultimately increasing fire size. Increased soil heating from burning logs kills soil micro-organisms and reduces soil productivity.

Failure to quickly act to remove dead trees before they significantly deteriorate may have severe consequences when the next wildfire occurs as shown in a study conducted on the LNF in the Cone Fire (2002). In areas of uncharacteristically large patches of high- and moderate-intensity burn, the fuel loading is a long-term concern, typically eight to 20 years following a fire when standing dead trees fall to the ground and become down woody material. This study found that most ponderosa pine snags had fallen within eight years of the fire in the 11.8 to 17.7 inch class, compared to 41 percent in the greater than 17.7 inch class. This study demonstrates that high levels of surface fuels may result within a relatively brief time period if salvage or fuels treatments are not completed, ultimately increasing the potential for a high intensity reburn.

Some areas identified for treatments may be less economical to log, but are critical for creating greater fire resiliency of future forests. Removing burned trees and fuels where tree mortality exceeds the needs for snag and log recruitment is the first step toward meeting the desired fuels conditions and protecting multiple resources, including soils and watersheds, from future high-intensity fires. In order to reintroduce fire into these areas as soon as possible, the current fuel load needs to be reduced and the continuity reduced to a level where fire would burn in patchy, mostly low, and some moderate, vegetative burn severities.

Fuels treatments are also needed in Baker cypress stands to increase future stand resiliency. Baker cypress generally relies upon high-intensity fire to open cones on mature trees and to prepare the seedbed for successful regeneration by exposing bare mineral soil. Baker cypress is scattered in varying densities across roughly 400 acres of the Cypress Plantation within the Eiler Project area. Most of these acres burned at high severity in the Eiler Fire, opening cypress cones, releasing seeds, and creating a seedbed of

bare mineral soil. There is a need to reduce fuels around Baker cypress stands where practicable to reduce the chance of fire occurring before newly-established Baker cypress trees can produce cones.

**To implement reforestation with considerations for vegetative diversity while providing for wildlife habitat diversity in burned forest stands.**

There is a need to act quickly to re-establish trees. Delaying the first steps of salvage harvest and fuels treatments would increase the treatments required to accelerate the successful restoration of a forested component on the landscape. Shrubs will quickly capture the site. Snags must be removed to safely operate in the area, and fuels must be reduced to prepare the site for planting.

Approximately 9,950 of the timbered acres on NFS lands burned under moderate to high severity, leaving uncharacteristically large patches deforested. Most of the non-serotinous<sup>3</sup> trees that would provide a conifer seed source were killed and seed for regenerating trees would need to come from the surrounding area. Due to the large patch size of moderate to high severity burn, reforestation is needed to accelerate conifer establishment and reduce the time to regenerate forest conditions. Re-establishing native forest cover quickly would minimize competition from brush and other vegetation and accelerate long-term establishment of forests that provide timber and habitat for various species. Understory vegetation, shrubs, particularly manzanita, and grasses and forbs would be expected to recover naturally.

Multiple forest cover types that include upland conifers (eastside pine and mixed conifer), hardwoods (oak, aspen, and cottonwoods), riparian, and Baker's cypress were deforested in the Eiler fire.

Reforestation techniques would be designed to establish the appropriate tree species, spatial arrangement, and density for each of the above cover types. This technique would increase landscape heterogeneity and provide for forest resiliency and wildlife habitat diversity within the burned forest stand.

Several riparian areas were burned during the Eiler Fire, including approximately 1.5 miles adjacent to Hat Creek on Forest Service lands (T43N, R5E, sections 26 and 35) and two seasonal wetlands with riparian vegetation, Cornaz Lake (T34N, R4E, section 20 E ½) and Dutch Flat (T34N, R4E, section 8 NE ¼). These riparian areas were largely denuded and riparian hardwoods were damaged or destroyed, which reduced habitat for riparian and aquatic species and removed ground cover that limits erosion and sedimentation. There is a need to re-establish riparian vegetation in these areas where limited vegetation sprouting and regrowth has occurred since the fire. Also, there is a need to reduce continuity of fuels to decrease the risk of these areas burning at high severity in the future in order to retain these limited and diverse areas on the landscape.

There is a need to improve soil conditions in the burn area prior to reforestation. The burned area includes three plantations that were windrowed in the past. Windrowing was a reforestation site preparation practice conducted mainly in the 1950s and 60s, to clear brush on planting sites in which topsoil was scraped off and pushed into piles as tall as five feet and up to 20 feet wide and hundreds of feet

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<sup>3</sup> Serotinous tree species are those whose cones open and shed seed when heat is provided by fires or hot and dry conditions (e.g. Baker cypress).

long. These piles still contain the nutrients and organic matter that were concentrated in the topsoil. Recent research conducted by the Pacific Southwest Research Station (PSW) has shown that windrowed topsoil can be spread and that trees benefit in the form of significant increased productivity where spreading is conducted.

### **Maintain road infrastructure for project implementation.**

In order to meet the objectives of salvage, fuels reduction, and reforestation, road access would be needed for multiple entries. The Eiler Project proposes to use existing Forest system roads wherever possible. Some existing non-system roads would be needed to provide access to implement the proposed projects. In addition, temporary roads and up to one mile of new construction would be needed to access the proposed treatment areas.

## **Public Involvement**

The following list outlines the public involvement process for the Eiler Project:

- The Rapid Assessment was presented and discussed with the Collaborative Forest Landscape Restoration Group (CFLR).
- The Rapid Assessment was presented and discussed at the annual meeting with the American Forest Resource Council (AFRC).
- Tribal Consultation meetings were held with the Pit River Tribe and the Susanville Indian Rancheria.
- Pre-Scoping News Releases were published with a brief description of the projects and project-lead contact information in the Lassen County Times on December 9, 2014; the Inter-Mountain News on December 3, 2014; and the Mountain Echo on December 16, 2014.
- The project was listed in the Lassen National Forest Schedule of Proposed Actions (SOPA) in January and April 2015.

## **Scoping**

Scoping for this project was initiated on December 19, 2014. Scoping information packets were made available to the public. Letters were sent to adjacent landowners, the Shasta County Board of Supervisors, the Hat Creek Fire Safe Council, the Central Valley Regional Water Quality Control Board, and the Natural Resource Conservation Service. The Pit River Tribe also received this information packet. Scoping information was published on the Lassen National Forest web site.

Twelve individuals/organizations responded in writing or verbally. All suggested changes to elements of the proposed action received from the public were considered. The analysis of the public comments is

contained in the document titled *Eiler Project Public Scoping Issue Analysis and Alternative Development* (located in the Eiler Project Record, HCRD office).

## **Issue Analysis and Alternative Development**

The Forest Service considered all potential issues (point of discussion, debate, or dispute). Non-issues are defined as : (1) outside the scope of the proposed action; (2) already decided by law, regulation, Forest Plan, or other higher level decision; (3) irrelevant to the decision to be made; or (4) conjectural and not supported by scientific or factual evidence. The Code of Federal Regulations (40 CFR Part 1501.7(3)) of The Council on Environmental Quality's (CEQ) NEPA regulations requires the Forest Service to "Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review."

### **Alternatives Considered But Eliminated From Detailed Study**

NEPA requires that Federal agencies rigorously explore and objectively evaluate all reasonable alternatives and briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Alternatives suggested during the scoping process were considered. Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm. Descriptions of all alternatives considered from scoping and the reasons for their elimination from detailed study are contained in the Eiler Project Public Scoping Issue Analysis and Alternative Development (Eiler Project Record). The following alternatives are based on scoping comments and were considered but dismissed from detailed consideration for reasons summarized below.

#### **A. Roadside Hazard Tree Only on ML 3, 4, and 5 Roads Only**

This alternative would only cut and remove hazard trees on high-use roads maintained for public use, or administrative facilities/infrastructure (campgrounds/buildings etc.); all other dead trees would remain. No further fuels treatments of smaller diameter material or reforestation would occur. Table 2 below provides a breakdown of the miles of roads subject to hazard tree removal.

**Table 2. Miles of Roads Within the Project Area Subject to Hazard Tree Removal**

<b>Road Maintenance Level</b>	<b>Road Mileage Within the Project Area to be Considered for Hazard Tree Removal</b>
2 – High Clearance Vehicles	24.7
3 – Suitable for Passenger Cars	3.2
4 – Moderate Degree of User Comfort	3.9
5 – High Degree of User Comfort	0.2
<b>Total</b>	<b>32</b>

This alternative was considered but eliminated from detailed study for the following reasons:

- This alternative does not meet the purpose and need to reduce safety hazards for the public and Forest Service employees in high use areas including along portions of NFS roads. Hazards would remain on a majority of roads in the project area (24.7 miles of ML 2 roads), which are used by the public for recreation (including hunting and wood gathering), serve as legal access to private timberland, and are used by Forest workers for administrative use. These ML 2 roads would remain open to the public, and as these trees deteriorate, they will become structurally weak and are prone to falling limbs, breaking apart, and/or toppling over completely. Many of the public that use this area live adjacent to the project area along the Hat Creek corridor of Highway 89.
- This alternative does not meet the need to recover the economic value of fire-killed trees. Most of the marketable timber would be left on site and not harvested. This would result in very little economic return for the local economy. See the Economics section of the Silviculture Report for further discussion.
- This alternative does not meet the need to reduce surface fuel loads to levels which minimize the danger and difficulty of suppressing future wildfires, and enhance future forest resiliency. Down woody material would continue to accumulate at a rate that is greater than decomposition, contributing to the surface fuel layer. Increased surface loads would result in increased flame lengths, fireline intensities, and resistance-to-control problems thus leading to increased firefighter risk. See discussions of Alternatives 2 and 3 in the Fire and Fuels Report for further discussion.
- This alternative does not meet the need to implement reforestation in burned forest stands. Re-establishment of forest cover would rely on natural regeneration and could take decades or longer. Without reforestation efforts, high severity fire areas (69% of the project area) would recover primarily with shrubs, resulting in a continued loss of forest habitat for an indefinite period of time. See discussions of Alternatives 2 and 3 in the Silviculture Report for further discussion.

Due to public suggestion, a Roadside Hazard Only alternative was fully analyzed, but included removing hazards from ML 2 and higher roads, to better help address needs.

**B. No Salvage Occur on Mature Conifer Forests Pre-Fire (CWHR 4M and above) That Burned at Moderate to High Intensity**

This alternative would prohibit salvage treatments in black-backed woodpecker habitat with the exception of hazard tree removal as described above (ML 3, 4 and 5 only).

Table 3 displays the amount of burned-forest, black-backed woodpecker habitat on USFS lands within the Eiler Fire footprint. As indicated, approximately 4,854 acres existed after the Eiler Fire (including 3M and 3D size classes) (BBWO Supplemental Report, Eiler Project Record).

Table 3. Acres of black-backed woodpecker habitat on USFS lands within the Eiler Fire perimeter by CWHR size class and density of all forest types.

CWHR	Acres of CWHR type burned at moderate and high severity
3M	184
3D	42
4M	2,600
4D	1,211
5M	547
5D	270
Totals	4,854

Black-backed woodpecker habitat was taken into consideration when developing the proposed action. Approximately 3,029 acres of habitat was left untreated with the Proposed Action. In addition, helicopter treatments were designed to leave a portion of habitat remaining (See Alternative 1 description below). Table 4 displays how proposed salvage harvests within Alternative 1 would affect this habitat. As indicated, approximately 62 percent of the available habitat is outside of salvage units.

Table 4. Acres of snags in burned forest ecosystem component within treatments proposed by the Eiler Project.

	Tractor Salvage Harvest	Helicopter Salvage Harvest	No Salvage Harvest	Total Acres
Acres	1,505	320	3,029	4854

In addition to the fact that black-backed woodpecker habitat was taken into consideration in project development, this alternative was considered but eliminated from detailed study for the following reasons:

- This alternative does not meet the purpose and need to reduce safety hazards for the public and Forest Service employees in high use areas including along portions of NFS roads. Hazards would remain on a majority of roads in the project area (24.7 miles of ML 2 roads, 8.5 of which are in BBWO habitat), which are used by the public for recreation (including hunting and wood gathering), serve as legal access to private timberland, and are used by Forest workers for administrative use. These ML 2 roads would remain open to the public, and as these trees deteriorate, they will become structurally weak and are prone to falling limbs, breaking apart, and/or toppling over completely. Many of the public that use this area live adjacent to the project area along the Hat Creek corridor of Highway 89.
- This alternative does not meet the need to recover the economic value of fire-killed trees. Much of the marketable timber would be left on site and not harvested. This would result in less economic return for the local economy. See the Economics section of the Silviculture Report for further discussion.
- This alternative does not meet the need to reduce surface fuel loads to levels which minimize the danger and difficulty of suppressing future wildfires, and enhance future forest resiliency. Down woody material would continue to accumulate at a rate that is greater than decomposition,

contributing to the surface fuel layer. Increased surface loads would result in increased flame lengths, fireline intensities, and resistance-to-control problems thus leading to increased firefighter risk. See discussions of Alternatives 2 and 3 in the Fire and Fuels Report for further discussion.

- This alternative does not meet the need to implement reforestation in burned forest stands. Re-establishment of forest cover would rely on natural regeneration and could take decades or longer. Without reforestation efforts, high severity fire areas (69% of the project area) would recover primarily with shrubs, resulting in a continued loss of forest habitat for an indefinite period of time. See discussions of Alternatives 2 and 3 in the Silviculture Report for further discussion.

### **Alternatives Considered in Detail**

Three alternatives were considered in detail: Alternative 1 (Proposed Action), Alternative 2 (No Action), and Alternative 3 (Roadside Hazard Only). Each is described in detail in Chapter 2. All proposed activities are consistent with the Forest Plan.

### **Decision Framework**

The Lassen National Forest Supervisor is the Responsible Official for this project proposal. The Forest Supervisor will decide whether to approve the proposed action, approve a modification to the proposed action, approve the roadside hazard only alternative, or take no action related to this proposal.

The decision will include a non-significant Forest Plan Amendment (FPA) for a deviation from the current LNF LRMP Standards and Guidelines for project implementation in a watershed that is over Threshold of Concern (TOC). The Lassen LRMP directs the Forest to adjust project impacts and/or timing to keep disturbance below the appropriate TOC in all affected subbasins and watersheds (LNF LRMP, pag 4-32 (22b(4))). Due to impacts associated with the Eiler Fire, the Eiler Gulch sub-watersheds in the project area is over threshold. A non-significant, site specific FPA would be necessary to meet management direction and permit project actions to occur.

## Chapter 2: Alternatives

This chapter describes and compares the alternatives. This chapter also details the design features and management requirements. The intent of these features and requirements is to protect resources and ensure that the Action Alternatives are consistent with the Forest Plan standards and guidelines. Design features that will be implemented are considered part of the proposed actions. Finally, this Chapter displays the alternatives in comparative form, defining the differences between them and providing a basis for a choice among the options by the Responsible Official. Maps for the action alternatives are found in Appendix A.

### Alternative 1 - Proposed Action

The proposed action was developed to accomplish the purpose and need for the Eiler Project by evaluating existing vegetation conditions, burn patterns and intensities, and land allocations within the analysis area.

**Table 5. Proposed treatment categories and estimated acres in the Eiler Project**

Proposed Treatment	Treatment Acres	Reforestation Acres			
		Conventional	Cluster	Founder	Natural Regen
Roadside Hazard Trees	1,174	580	228	68	297
Area Salvage – Ground Based	2,567	1,357	1,119	27	65
Area Salvage – Helicopter Based	481	33	47	402	0
Area Fuels - Mechanical	517	250	39	7	221
Area Fuels - Hand	3,602	114	822	536	2,129
Baker Cypress Treatment	361	0	0	16	345
Reforestation Only		0	0	0	815
Total Acres	8,702	2,334	2,255	1,056	3,872
<b>Deferred Treatment</b>					
Natural Recovery	5,384				
Roadside Hazard Trees	34 miles				
Trailside Hazard Trees	2 miles				

*Note: These acreages have been adjusted during analysis and implementation due to reductions for wildlife habitat, RCAs, archeological sites, stand deterioration, etc.*

## **Hazard Tree Removal**

The LNF proposes to fell and remove or fell and leave in place fire-affected hazard trees posing critical threats to safety along 34 miles of maintenance level 2 (ML2) and higher roads, and along two miles of trail within the Eiler Fire perimeter. Hazard tree marking guidelines would be based upon the fire-injured tree marking guidelines (Report #RO-11-01, Smith and Cluck, May 2011) at the 0.6 probability of mortality level ( $P_m=0.6$ ) and hazard tree marking guidelines (Report #RO-12-01, Angwin et al., April 2012) developed by Region 5 Forest Health Protection. The guideline criteria for delayed, fire-related conifer tree mortality are based on percent crown length killed. The objectives of these guidelines are to: (1) remove those trees that are dead or have a high probability of mortality due to fire-injury or have structural defects that indicate high failure potential to abate potential hazards to visitors and improve safety and access within the Eiler Fire area; and (2) retain those trees that would likely survive to maintain visual quality, wildlife habitat, and recreational values. This balance aims to retain healthy forested conditions while providing for safety and access to the area. Hazard trees are usually within one and a half tree lengths away from the road.

Merchantable trees would be removed using area salvage. Sub-merchantable trees and non-merchantable hazard trees would be felled and left in place, or piled and the piles burned, or broadcast burned depending upon the amount of surface fuel loading present.

Hazard trees would be felled and left in the Thousand Lakes Wilderness along trails and adjacent to campsites. Hazard trees would also be felled and left in place along the portion of the 33N06Y road that is in the IRA just north of the Thousand Lakes Wilderness. No other actions will take place in the wilderness and IRAs.

No snag retention is planned in these areas. Reforestation strategies in the Hazard Tree units would be the same as adjacent stands.

## **Area Salvage Harvesting**

The Forest Service is proposing to salvage harvest fire-killed and fire-injured trees within the perimeter of the Eiler Fire. Merchantable trees would be removed as sawlogs if operations occur in a timely manner before the wood deteriorates. Non-merchantable trees of smaller diameters would be removed as biomass, masticated, felled and lopped, machine or hand piled and burned, and/or broadcast burned to meet desired fuels conditions.

Fire salvage marking guidelines are based upon the fire-injured tree marking guidelines (Report #RO-011-01, Smith and Cluck, May 2011) developed by Region 5 Forest Health Protection at the 0.7 probability of mortality level ( $P_m = 0.7$ ). The guideline criteria for delayed conifer tree mortality are based on percent crown length killed. The objectives of these guidelines are to: (1) remove those trees that

are dead or have a high probability of mortality due to fire-injury; and (2) retain those trees that would likely survive to maintain wildlife habitat and desired forest cover.

The salvage harvest operations would utilize ground-based, mechanical harvesting to remove fire-killed and fire-injured trees from treatment areas on slopes 35 percent or less. On slopes greater than 35 percent, hand-felling and yarding by helicopter would be used to salvage harvest fire-killed and fire-injured trees from treatment areas. Area salvage harvesting would occur on approximately 3,048 acres. Natural and activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned. The number of acres treated by broadcast burning or pile burning is dependent on the amount of biomass removed from within the mechanical or hand treatment units. If more biomass is removed, the number of broadcast or pile burning acres would most likely decrease. The maximum for burning is used in this proposal.

With the proposed area salvage activities, approximately 125 acres would be treated within RCAs adjacent to stream channels and seasonal wetlands. Approximately 110 acres would be treated using ground-based mechanical equipment. In the remaining acres within RCAs proposed for area salvage, harvest activities would consist of hand-felling and helicopter yarding.

Within tractor units, snag retention leave islands would be generally two to five acres in size, and would comprise approximately 25 percent of the acres within each unit. Leave patches would be distributed across the unit to maintain diversity. While rocky areas may represent a small proportion of such patches, the majority would be in good growing sites so that the patches would contain an abundant understory in the future. Snag clump locations would not occur within 150 feet of aspen and cottonwood communities on the east, south, and west side stand or 100 feet on the north side to maximize light to the stand and allow for expansion.

Within the helicopter units, approximately 100 square feet of basal area per acre of snags would be left to maintain black-backed woodpecker habitat ranging from 10 inches diameter at breast height (DBH) to an upper diameter that will vary by unit. All snags less than 10 inches DBH would also be left. Snags deemed as safety hazards during operations will be felled and left on site.

Snag retention would differ in the RCA land allocation to provide for future woody debris recruitment that would provide habitat structure and hydrologic function such as sediment trapping. The amount and distribution of standing trees retained would represent the range of natural variability of pre-fire suppression conditions. Within wet and dry meadows and intermittent stream RCAs, a minimum of one to two snags greater than 15 inches in diameter would be retained per 100 feet.

### **Area Fuel Treatments**

In areas that were deforested but the size of the remaining timber is sub-merchantable, the Forest Service is proposing to treat fire-killed and fire-injured trees. Non-merchantable trees of smaller diameters would be removed as biomass, masticated, felled and lopped, machine or hand piled and burned, or broadcast

burned. Trees designated for removal and snag retention would use the same guidelines as discussed above under Area Salvage.

Snag retention leave islands would use guidelines as those discussed above for tractor area salvage units.

### ***Mechanical***

The fuels treatment operations could utilize ground-based, mechanical equipment to remove or arrange fire-killed and fire-injured trees from treatment areas on slopes 35 percent or less. Mechanical area fuels treatments would occur on approximately 517 acres. Activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned.

### ***Hand***

Hand felling would be used on slopes greater than 35 percent, in areas inaccessible to mechanical equipment, and in areas where the biomass is not removed. Hand fuels treatments would occur on approximately 3,602 acres. Natural and activity-generated fuels would be broadcast burned or piled mechanically or by hand, and piles burned.

The number of acres treated by broadcast burning or pile burning is dependent on the amount of biomass removed from within the mechanical or hand treatment units. If more biomass is removed, the number of broadcast or pile burning acres would most likely decrease. The maximum for burning is used in this proposal.

### ***Baker Cypress***

Fuels treatments proposed in Baker cypress stands depend upon cypress density. On 200 acres where cypress occurs as isolated trees or small stands, standing fuels would be mechanically piled and burned. On 150 acres where pre-fire densities of cypress were high, and natural regeneration of cypress trees is expected to be high, hand-thinning treatments would occur only in areas where impacts to Baker cypress seedlings could be avoided. On 10 acres within the Eiler Gulch area where Baker cypress is scattered along the riparian corridor, hand thinning and pile burning activities are proposed. No additional site preparation would occur, although windrow spreading may occur within Baker cypress treatment units where windrows are not occupied by Baker cypress.

The remainder of the cypress occurs within hazard tree units or salvage units where impacts to the cypress would be minimized through project design features. Broadcast burning activities are not proposed within Baker cypress occurrences.

### ***Reforestation***

Reforestation is proposed on approximately 5,645 acres within the project area in sites prepared by salvage harvest and fuels treatment. In addition, sprouting shrubs and vegetation may need to be treated adjacent to planted trees to reduce competition for site resources in order to assure establishment. This may be done through manual or mechanical cutting methods such as grubbing, mastication, or the use of

brush cutters. Soil windrows within burned areas would be spread out using heavy mechanical equipment. An effort will be made to spread the soil as evenly as practicable. All site preparation would occur prior to planting. Reforestation would typically need to occur within two years to increase the probability of survival of the planted trees with the competing brush.

Tree planting strategies would be implemented to comply with Region 5 Stocking Guidelines over time. These guidelines define future minimum and recommended stocking levels by forest type and site class, ranging from 75 to 300 trees per acre. Lower quality sites would have lower stocking levels than higher quality sites, contributing to a heterogeneous forest structure across the landscape. Planted tree species would be appropriate for the site and would include a mixture of Jeffrey, ponderosa, western white, sugar pine, Douglas-fir, or incense-cedar. Red fir would be planted if a seed source is not present. Only native tree species grown from locally collected seed sources would be planted.

Four planting strategies are proposed for reforestation: conventional planting, cluster planting, founder stands, and natural regeneration (see Silviculture Report for description of strategies and locations). Planting strategies would be utilized to assist in creating forest heterogeneity at different scales to produce a more disturbance-resilient landscape and enhance ecological function in the future. Topography, slope position, aspect, slope steepness, and soil productivity would be taken into account to create different forest structures on the landscape that mimic those created by an active fire regime. For example in steeper high elevation areas, density and canopy cover would be highest in valley bottoms, decreasing over the midslope and become lowest near and on ridgetops. In lower elevation broad valley bottoms, densities and canopy cover would be lowest near the bottoms and increase with elevation. Density and canopy cover along the hill slope would be higher on northeast aspects compared to southwest and vary with slope becoming more open as slopes steepen. This strategy would not only create heterogeneity to increase resiliency but would also create habitat for species that prefer denser canopy mature forest structures, such as northern goshawks. No reforestation would occur in snag retention leave islands.

Spacing for reforestation strategies were developed for these areas to encourage hardwoods and enhance meadow and riparian function. Hardwood trees would be encouraged and promoted where they exist in plantations. Planting densities would be lower and trees widely spaced around California black oak. Conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than three feet tall.

Reforestation of conifers would not occur within 150 feet of aspen and cottonwood communities on the east, south, and west side stand or 100 feet on the north side to maximize light to the stand and allow for expansion. Where browsing inhibits recruitment of regenerating aspen and cottonwoods, fencing would be implemented to protect regeneration until suckers and sprouts exceed the browse line.

Reforestation planting strategies would differ as well with no reforestation occurring within 50 feet of the meadow edge. From 50 feet of the meadow edge and out, planting density would increase using the planting strategy and spacing based on the surrounding forest stand condition. Along stream channels and

seasonal wetlands with existing riparian communities (e.g. willow, alder, aspen, sedges, rushes, etc.), reforestation of conifer species would not occur within 20 feet of the riparian plant community.

Where Baker cypress is widely scattered, reforestation with Baker cypress in founder stands would occur on up to 16 acres. Reforestation would not occur where pre-fire cypress distribution occurred at high densities and natural regeneration of cypress trees is expected to be high. No additional release activities would occur.

Forest Service personnel would visit riparian areas within the Eiler Fire perimeter during the growing season of 2015 to determine the amount and effectiveness of natural regeneration. If vegetation regrowth does not appear to be sufficient, then willow, aspen, sedges, and/or other appropriate riparian species would be hand planted as a follow-up treatment.

First- and third-year survival examinations on all planted units would occur. Planted units would be assessed for competing vegetation and the need for follow-up treatment to ensure survival and stocking are met. The proposed action includes at least one release treatment using manual or mechanical methods such as hand grubbing, mastication, or brush cutting to control competing vegetation within one to three years and a second treatment conducted within two to five years of planting. Animal control actions such as protective barriers or trapping may be used if warranted. Sites planted with trees should be certified of establishment five years after planting.

### **Transportation System**

Where possible, the existing forest transportation system would be used to provide access to treatment units. Road maintenance, including surface protection and erosion control, would be performed on portions of the system as needed for project implementation. A dust abatement plan would be included to control wind-caused erosion from road use. National Forest System roads and non-paved County roads used for haul would receive pre-, during-, and post-haul maintenance.

Approximately 2.4 miles of existing non-system roads within the project area would be needed for project implementation, including salvage and fuels treatments, reforestation, and maintenance, due to the changed condition caused by the fire. These non-system roads would be added to the Forest transportation system as ML2 roads. Approximately one mile of new construction would occur to implement proposed actions. These roads would also be added to the Forest transportation system as maintenance level 1 (ML1) roads. Approximately one mile of temporary roads may be constructed to access proposed treatment areas. Following project implementation, these temporary roads would be decommissioned.

All water sources proposed for use in this project for dust abatement would be brought up to best management practice (BMP) standards, if they currently do not meet those standards. Water sources proposed for use in implementing this project include:

- Bidwell Pond (T34N R4E, S ½ Sec. 1) and
- Boundary Camp (T35N R4E SW¼ Sec. 33).

## Alternative 2 - No Action

Under the No Action alternative, none of the activities proposed under Alternative 1 would be implemented. Hazard tree felling could occur along roads currently open to the public, trails, and developed recreation sites. These hazard trees could be felled and left in place as part of road maintenance as per LRMP direction. The No Action alternative would not preclude activities already approved in this area or activities planned as separate projects. No fuels treatments, site preparation, or reforestation would occur.

## Alternative 3 - Road Hazard Only

To respond to concerns raised during public scoping, the Responsible Official has proposed limiting treatment to hazard tree removal along approximately 32 miles of roads. Commercial sized hazards would be felled and removed along ML 2 and higher roads. Sub-merchantable hazards would be felled and left in place or piled and burned. No other site preparation or reforestation would occur along these roads. No other management activities (besides those previously authorized) would occur. The total footprint of treatments on National Forest lands under Alternative 3 would be approximately 1,095 acres. Existing roads used under this alternative would be repaired and maintained.

## Integrated Design Features

The following Integrated Design Features (IDFs) are resource protection measures that are developed by specialists and incorporated as part of all action alternatives for the project. They would be in addition to standards and guidelines from Best Management Practices (BMPs) and the Lassen LRMP, as amended. These IDFs are implementation parameters that would be incorporated into treatments, contracts, or used to guide Forest Service personnel in conducting implementation.

**Table 6. Integrated Design Features for Action Alternatives of the Eiler Project**

IDF	Description	Alternative	
		1	3
Air Quality			
1	A dust abatement plan would be developed and implemented. Logging and vegetation management activities would be dust abated where rubber-tired vehicles are operating on haul routes. Water for dust abatement would be trucked-in, or a dust palliative may be approved which may include magnesium chloride, calcium chloride, lignin sulfate, or an approved equal. Dust palliatives would not be used within 25 feet of live streamcourses and seasonal wetlands. Dust palliatives would be stored and mixed outside of RCAs.	x	x
Threatened, Endangered, and Sensitive (TES) and Special Interest Plant Species			
2	All ground-disturbing activities would be excluded from occurrences of <i>Pinus albicaulis</i> (whitebark pine). Locations would be displayed as control areas on all contract maps.	x	x

3	Mechanical timber harvest activities, mechanical fuels treatment activities, tree planting activities, and site preparation and release activities would be excluded from occurrences of all TES plant species, from occurrences of the special interest plant species <i>Penstemon heterodoxus</i> var. <i>shastensis</i> (Shasta beardtongue) and <i>Cardamine bellidifolia</i> var. <i>pachyphylla</i> (alpine bittercress), and from within 50 feet of trees or seedlings of <i>Hesperocyparis bakeri</i> (Baker cypress) within salvage, fuels, and Baker cypress treatment units.	x	
4	Hand-thinning activities would be permitted within occurrences of <i>Penstemon heterodoxus</i> var. <i>shastensis</i> ; however, trees would be directionally felled away from plants where practicable. Hand-thinning activities would be permitted within occurrences of <i>Hesperocyparis bakeri</i> only if cypress seedlings could be avoided through directional felling within salvage, fuels, and Baker cypress treatment units.	x	
5	Hand and machine piles and landings would be excluded from known occurrences of any TES plant species, from the special interest plant species <i>Cardamine bellidifolia</i> var. <i>pachyphylla</i> , <i>Hesperocyparis bakeri</i> , <i>Penstemon heterodoxus</i> var. <i>shastensis</i> , and <i>Thermopsis californica</i> var. <i>argentata</i> (silvery false lupine), and from the Burney grassland study area in all units.	x	x
6	Within hazard tree units, trees would be directionally felled away from trees or seedlings of <i>Hesperocyparis bakeri</i> , from the Burney grassland study area, and from occurrences of <i>Cardamine bellidifolia</i> var. <i>pachyphylla</i> where practicable. Where trees of <i>Hesperocyparis bakeri</i> are felled as hazard trees, they would be left in place. Seedlings of <i>Hesperocyparis bakeri</i> would be avoided where practicable.	x	x
7	Broadcast burning activities would be excluded from occurrences of <i>Hesperocyparis bakeri</i> .	x	
8	Windrow spreading activities would be excluded from within 50 feet of occurrences of <i>Hesperocyparis bakeri</i> .	x	
9	New occurrences of TES and Special Interest plant species discovered before or during ground-disturbing activities would be protected through flag-and-avoid methods (with the exception of <i>Astragalus inversus</i> , for which no special protections would be required).	x	x
<b>Invasive Plants</b>			
10	Staging of equipment would be done in weed-free areas.	x	x
11	Known noxious weed infestations would be identified, flagged where possible, and mapped for this project. Locations would be displayed on contract maps. Identified noxious weed sites within or adjacent to the project area containing isolated patches with small plant numbers would be treated (hand pulled or dug) by forest botany staff prior to project implementation. Any larger or unpullable infestations would be avoided by harvesting equipment, or equipment used would be washed on site before leaving the infested area and entering un-infested areas to prevent spreading weeds within the project area.	x	x
12	New small infestations identified during project implementation would be evaluated and treated according to the species present and project constraints and avoided by project activities. If larger infestations are identified during implementation, they would be isolated and avoided by equipment, or equipment used would be washed on site before leaving the infested area and entering un-infested areas.	x	x

13	Mechanical equipment would be excluded from known infestations of yellow starthistle (LNF #97) and medusahead (LNF #79) on Brown Butte.	x	x
14	Post-project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible and for a period of multiple years after completion of the project.	x	x
15	If project implementation calls for mulches or fill, they would be certified weed-free. Seed mixes used for re-vegetation of disturbed sites would consist of locally-adapted native plant materials to the extent practicable.	x	x
16	As part of pre-haul maintenance, Road 34N76 would be bladed or scraped prior to project implementation to ensure that yellow starthistle along this road is not moved into the project area.	x	x
<b>Cultural Resources</b>			
17	Class I (eligible properties) and Class II (potentially eligible properties) historic properties within or adjacent to treatment areas, activity areas (i.e., landings, water sources, etc.), or access roads would have their boundaries flagged and tagged as non-entry zones for all project activities. No project-related activities shall occur within site boundaries.	x	x
18	Class I and Class II historic properties located within the project Area of Potential Effect (APE) but not in close proximity to identified treatment areas shall be protected from indirect project impacts such as use of sites for staging equipment or vehicles (i.e., timber harvest equipment, water trucks, road construction, reconstruction or maintenance equipment, Forest Service vehicles, etc.) or any other activities. A Forest Service project manager would be apprised of all site locations to insure protection from direct as well as indirect effects; permanent tags shall define the site boundary.	x	x
19	Linear sites such as historic roads, ditches, or communication lines may be crossed on a limited basis in previously disturbed areas. All crossings would be made perpendicular to the site, and the site would be returned to its original design at project completion. All crossings would be designated by heritage personnel.	x	x
20	Hauling on NFS roads that bisect historic properties would continue. Vehicles and equipment using these roads must stay on the road prism in areas that bisect historic properties. New road construction, reconstruction, decommissioning, or modification of the existing prism within site boundaries would not occur without additional review and/or consultation.	x	x
21	Forest system spur roads and non-system roads that bisect archaeological sites shall not be used except under the following circumstances: road redesigned to exclude historic properties, heritage properties have been evaluated and determined ineligible for the NHRP, or protective material is placed on roadbed in sufficient quantity to protect surface of site from disturbance.	x	x
22	Historic properties within or adjacent to planned treatment areas, activity areas, or roads would be monitored during and after project completion.	x	x
23	Hand piles will not be constructed or burned within the boundaries of historic properties unless locations (e.g., a previously disturbed area) have been specifically approved by Heritage Program Managers (HPMs) or qualified Heritage Program staff.	x	x

24	Felling and removal of hazard trees within historic properties may occur under the following conditions:	X	X
	• Trees may be limbed or topped to prevent soil gouging during felling;		
	• Felled trees may be removed using only the following techniques: hand bucking, including use of chain saws, and hand carrying, rubber tired loader, crane/self-loader, helicopter, or other non-disturbing, HPM-approved methods;		
	• Equipment operators shall be briefed on the need to reduce ground disturbances (e.g., minimizing turns);		
	• No skidding or tracked equipment shall be allowed within historic property boundaries.		
25	Tree planting by hand following a wildfire may occur within a historic property when a low impact method is used (e.g., planting bar; no mechanical auger), and where heritage personnel have determined that such activities would not affect the integrity of historic properties.	X	
26	If cultural resources are identified during project implementation (unanticipated discovery) all work would cease immediately in that area until the situation is reviewed and an assessment and mitigation plan instituted to insure protection of the site.	X	X
<b>Fuels</b>			
27	Fire lines would be constructed for prescribed fire operations, except where existing roads, skid trails, or natural barriers would serve as control lines. Hand lines would not be constructed within Riparian Conservation Areas (RCAs) and wet meadow areas where graminoid and forb indicator species of a wet site are present.	X	X
28	Pile burning and ignition for underburning would not occur within wet or dry meadow areas or where graminoid and forb indicator species of a wet site are present; however, low intensity fire would be allowed to back into portions of these meadows.	X	X
29	Where riparian communities are established, minimize disturbance to riparian vegetation and retain sufficient ground cover by conducting prescribed fire in a manner which limits the intensity of fire.	X	X
30	Do not place snag retention leave islands within the Roadside Hazard Tree Removal areas.	X	
31	Do place snag retention leave islands within approximately 150 to 200 feet along the boundary of the Thousand Lakes Wilderness and/or Roadless area at the southern end of the project.	X	

<b>Recreation and Visual Quality</b>			
32	National Forest Transportation System (NFTS) trailheads and trails would be protected during operations and informational signs posted in advance of project implementation.	x	x
33	Cut tree marking would be applied within 150 feet of NFTS trails, including the Lassen Backcountry Byway within Retention (R) and Partial Retention (PR) Visual Quality Objectives (VQO) classes in areas where residual green trees are greater than 50 percent.	x	x
34	Operations-created slash within 50 feet of trails and view roads, including the Lassen Backcountry Byway, would be piled, and piles burned or removed within one year. Post treatment, in areas where residual green trees are greater than fifty percent, piles would be located a minimum of 50 feet from the edge of trail or view road.	x	x
35	Within areas with the Recreational Opportunity Spectrum (ROS) designation of semi-primitive, non-motorized (SPNM), impacts of mechanical treatment would be minimized.	x	x
36	In salvage units, trees removed within 50 feet on either side of NFTS trails would leave a maximum eight-inch stump.	x	x
37	Equipment crossings of trails would be limited to designated crossings. The trail tread would be restored at crossings.	x	x
38	In areas of high recreational use, some vegetation, where available, would be left along the edge of trails and roads. Residual vegetation can act as a visual barrier to discourage future unauthorized routes.	x	x

### Riparian Conservation Areas

RCA widths are allocated along all seasonally flowing streams, both ephemeral and intermittent, wetlands, and wet meadows in accordance with the 2004 SNFPA ROD, as described below.

RCA Widths		
RCA Type	RCA Width	Project Water Feature
Perennial Stream	300 feet (each side of stream), measured from bank- full edge of stream	Hat Creek and Honn Creek <sup>4</sup>
Seasonally Flowing Streams (includes ephemerals with defined stream channel and evidence of scour)	150 feet (each side of stream), measured from bank- full edge of stream	Eiler Gulch, several ephemeral streams scattered throughout the project area that lack connectivity to perennial surface waters
Special Aquatic Features (includes wet meadows, wetlands, and springs)	300 feet from edge of feature or riparian vegetation, whichever width is greater	Seasonal wetlands, including Dutch Flat and Cornaz Lake.

IDF	Description	Alternative	
		1	3
39	A minimum 10-foot “no mechanical equipment” buffer would be designated along seasonal streams.	x	x
40	In RCAs of streams and special aquatic features the following IDFs would be implemented in order to meet Riparian Conservation Objectives (RCO):	x	x
	<ul style="list-style-type: none"> <li>Soils must be dry at the 10-inch depth before heavy equipment could be operated in these areas.</li> </ul>		
	<ul style="list-style-type: none"> <li>New landings would be located outside of RCAs. Existing landings within RCAs would not be used with the exception of the 50 foot outer zone of RCAs, where existing landings may be utilized as agreed upon prior to implementation.</li> </ul>		
	<ul style="list-style-type: none"> <li>Conifers would be harvested with feller-bunchers that have 24-inch or greater track widths.</li> </ul>		
	<ul style="list-style-type: none"> <li>Turning of equipment would be minimized.</li> </ul>		
	<ul style="list-style-type: none"> <li>Ground-based equipment would be kept off areas with slopes greater than 20 percent within RCAs.</li> </ul>		

<sup>4</sup> No mechanical treatments are proposed in the RCAs for Hat Creek and Honn Creek.

40 cont	<ul style="list-style-type: none"> <li>Skid trails would be kept to a minimum and no waterbars would be installed after treatment. Stream and meadow crossing locations would be agreed to and designated on the ground prior to use.</li> </ul>	X	X
	<ul style="list-style-type: none"> <li>Ground-based equipment would be used to remove timber using one-end suspension.</li> </ul>		
	<ul style="list-style-type: none"> <li>Skid trails within RCAs would require 90 percent of existing ground cover on bare soil on the trails. Insuring placement of this cover after treatment would require spreading slash over these open areas.</li> </ul>		
	<ul style="list-style-type: none"> <li>Conifers necessary for stream bank stability would be retained.</li> </ul>		
41	Machine piling would not occur in RCAs.	X	X
42	Erosion hazard mitigations, such as mulch, rice straw, and straw waddles, may be utilized if needed to meet RCOs.	X	X
43	In RCAs, hand-felled trees would be limbed and tops left to provide surface roughness and ground cover.	X	X
44	For ephemeral streams in hazard tree units, ground based mechanical equipment would be restricted to the road prism.		X
45	Hand-felling within the RCA (and mechanical restriction zone) would be permitted.	X	X
46	Riparian species (aspen, cottonwood, alder, willow, dogwood, etc.) would not be removed.	X	X
47	If deemed necessary, seasonal stream crossings may be designated prior to implementation.	X	X
48	In RCAs, site preparation may be completed by hand within equipment exclusion zones. No site preparation or planting would occur within an aquatic feature.	X	
<b>Silviculture</b>			
49	Black oak, aspen, and other hardwoods, alive or dead, that are three feet tall or greater would be retained and protected within treatment units within the limits of safety and operability.	X	X
50	All stumps 24 inches in diameter and greater within 200 feet of NFS roads would be treated in all vegetation types except aspen, with either Sporax® or Cellu-Treat® to prevent the spread of annosus root disease. No Sporax or Cellu-Treat would be applied within 25 feet of known sensitive plants, special interest plants, or live streamcourses and special aquatic features, shown on the contract map.	X	X
51	No reforestation will occur within 50 feet of snag retention islands to provide a safe working environment for workers.	X	
<b>Soils</b>			
52	In treatment units outside of RCAs, soil moisture conditions would be evaluated using Forest established visual indicators before equipment operations proceed. Lassen National Forest Wet Weather Operations and Wet Weather Haul Agreements would be followed to protect the soil and transportation resources.	X	X

53	Areal extent of detrimental soil disturbance would not exceed 15 percent of the area dedicated to growing vegetation. Soil porosity would be at least 90 percent of undisturbed conditions.	x	x
54	Following implementation, the project site would be evaluated by a qualified specialist to determine if detrimentally compacted ground exceeds the LRMP standard of 15 percent areal extent. If restoration is needed to achieve compliance an appropriate subsoiler, ripper, or other implement would be used to fracture the soil in place, leaving it loose and friable. Landings no longer needed for long-term management would be remediated as described. Where landing construction involved cut and fill, the landing would also be re-contoured to match the existing topography.	x	x
55	To the extent possible, existing landings and skid trails would be utilized.	x	x
56	Mechanical equipment would not operate on slopes greater than 35 percent, except on cinder cones, where mechanical equipment would not operate on slopes greater than 20 percent.	x	x
57	Where available, approximately five tons per acre of slash, duff, wood chips, and woody debris would be left in the treatment areas.	x	x
58	Where available, a minimum of five logs per acre, representing a range of decomposition classes, would be retained. This may include the three logs retained on the landscape for wildlife habitat.	x	x
59	On slopes greater than 20 percent, in addition to water bars, slash (where available) will be placed on all skid trails to achieve a minimum of 75 percent soil cover (rock, woody debris, vegetation, and litter). On rhyolitic soils if slash is not available weed-free straw will be used.	x	x
60	Outside of RCAs, retain litter and duff at a minimum of 50 percent, where available.	x	x
61	Machine piling operations would remove only enough activity-generated slash to accomplish surface fuel reduction needs.	x	x
62	Piling activity-generated slash would be conducted to minimize the amount of soil displaced into burn piles. Duff and litter layers would be left as intact as possible.	x	x
<b>Wildlife</b>			
Protected Activity Centers (PACs): Harvest activities may occur in northern goshawk and California spotted owl PACs that have been rendered unsuitable as determined by the wildlife biologist and documented within a Biological Evaluation.			
63	Treatment activities would not occur within suitable post-fire California spotted owl or goshawk habitat.	x	x
64	A Limited Operating Period (LOP) would be in effect from February 15th through August 15th within ¼ mile of spotted owl activity centers, unless surveys confirm that California spotted owls are not nesting. If the nest site cannot be determined, the LOP would be within ¼ mile of the established PAC.	x	x
65	An LOP would be in effect from February 15th through September 15th within ¼ mile of active goshawk nests, unless surveys confirm that northern goshawks are not nesting.	x	x

66	In addition to the overall snag retention, retain large diameter cull trees that may be of use as den sites by bears and other wildlife.	x	x
67	No fire salvage within the (southern) spotted owl PAC. Limit fire salvage to only that necessary for the establishment of founder stands within the eastern portion of the HRCA (eastern halves of sections 32 and 5).	x	
	<u>Downed Woody Material</u>		
68	Where available, three down logs per acre greater than 15 inches in diameter and 15 feet in length would be retained.	x	x
69	Avoid disturbing existing large down wood, greater than 15 inches in diameter and 15 feet in length.	x	x
70	Provide for additional down woody material by leaving felled cull trees (dead trees with less than 25 percent sound wood) on site as needed to meet the three logs per acre requirement for down wood.	x	x

## Chapter 3: Environmental Consequences

This section describes the environmental impacts of the alternatives in relation to whether or not there may be significant environmental effects as described in 40 CFR 1508.27. The following documents are summarized in this EA and are available upon request and are hereby incorporated by reference into this assessment:

- Silviculture Report for the Eiler Fire Salvage and Restoration Project; Harrison-Smith, June 4, 2015 (Silviculture Report)
- Eiler Fire Salvage and Restoration Project, Report for Fire and Fuels; Lewis, June 9, 2015 (Fire and Fuels Report)
- Management Indicator Species Report, Eiler Project; Rickman, April 14, 2015 (MIS Report)
- Biological Evaluation for the Eiler Project; Rickman, June 11, 2015 (BE)
- Biological Evaluation and Assessment for R5 Forest Service Sensitive and Federally Listed Plant Species, Eiler Fire Salvage and Restoration Project; Bovee and Sanger, April 14, 2015 (Botany BE/BA)
- Eiler Fire Salvage and Restoration Project, Hydrology Report; Blaschak, June 11, 2015 (Hydrology Report)
- Soil Specialist Report, Eiler Fire Salvage and Restoration Project; Peters, April 14, 2015 (Soils Report)
- Cultural Resources Report, Eiler Fire Salvage and Restoration Project; Gudiño, June 5, 2015 (Cultural Report)
- Eiler Fire Salvage and Restoration Project, Transportation Report; Nagel, April 14, 2015 (Transportation Report)
- Eiler Fire Salvage and Restoration Project, Recreation and Visual Quality Resources; Taylor, April 14, 2015 (Recreation and Visual Resources Report)

Additional documents used for the Eiler Project are also available upon request and are hereby incorporated by reference into this assessment, including the following:

- Migratory Landbird Conservation on the Lassen National Forest, Eiler Project Assessment; Rickman, April 14, 2014 (Migratory Landbird Assessment)
- Supplemental Black-Backed Woodpecker Assessment, Eiler Fire Salvage and Restoration Project, Rickman, April 14, 2014 (Black-Backed Woodpecker Assessment)
- Eiler Project, Invasive Plant Risk Assessment; Bovee and Sanger, April 14, 2014 (Invasive Plant Risk Assessment)
- Past, Ongoing, and Reasonably Foreseeable Future Actions Report for Eiler Project (PORFFA), April 14, 2014

Further analysis and conclusions about the potential effects are available in the above reports and other supporting documentation located in the project record. The following sections are discussions of resources that have relevance to a determination of significance. The cumulative effects boundary for each resource was the Eiler Project area, unless otherwise defined.

## Silviculture

A summary of the cover types and density class distribution using the California Wildlife Habitat Relationship (CWHR) for the pre- and post-fire conditions, the proposed vegetative treatments under Alternatives 1 and 3, and an explanation of the indicators can be found in the project record in the Silviculture Report.

### Alternative 1

#### Direct and Indirect Effects

*Hazard Tree, Area Salvage, and Area Fuels:* Direct effects of the hazard tree treatment would be removal of hazards along publically traveled roads, increased safety for people using these roads, and utilization of forest products.

Direct effects of hazard tree and salvage harvest would be the capture of economic value. The potential revenue from a timely executed timber sale could help offset the costs of other treatments such as removal of fire-killed biomass, additional fuel treatments, and reforestation costs. Timber sales also help support the forest product industries as well as the local communities that rely on revenue generated by forest products. See Economic section below.

Damage to residual trees and vegetation may occur during mechanical operations including damage to stems, bark scraping, wrenched stems, broken branches, broken tops, and crushed foliage (McIver et al. 2003). These effects are typical in logging operations, but care would be taken to minimize the potential for damage to residual trees. The Forest Service would inspect timber sales during harvesting to ensure that damage to residual trees and vegetation is within reasonable tolerances.

Damage and/or mortality of natural regeneration may occur during mechanical operations, particularly in ground-based harvesting treatments (Donato 2006), however this should be minimal as natural regeneration is expected to be low due to the large patch size of high severity fire in the project area. Areas where the risk of seedling damage and/or mortality is greatest would be within or near skid trails and landings. However, reforestation after salvage logging activities would allow managers to have better control over density, spacing, and desirable conifer species.

Indirect effects include fuel reduction and increased safety for wildland fire fighters. Activity fuels in excess of what is needed for soil cover from the timber sales would be piled and burned. Treatments would reduce excessive fuels in the future, thus decreasing potential fire severity if the area were to burn again (Brown et al. 2003). Treatments would facilitate artificial and natural regeneration efforts and help protect plantations, which are both an investment of money and resources, once they become established. Harvesting dead and dying trees that are in excess of other resource needs would provide a safer work environment during tree planting and release. Seedlings and saplings would be at high risk from any wildfire event in early stages of growth due to low crown heights and heavy shrub growth. Reducing existing and future heavy fuel loading prior to planting would help to protect young plantations should wildfire occur in the future. Reduced fuels from salvage operations could increase firefighters' safety.

*Reforestation:* Planting trees as soon as possible following a fire ensures the best possible survival rate, especially without use of herbicides to release planted seedlings from vegetation competition. Deferring reforestation treatments until 2018 would result in the need for even more ground disturbing activities to achieve any reforestation results. Deferred site preparation activities would need to treat highly competitive vegetation by pulling shrubs and scraping the ground to expose bare mineral soil. Even with these kinds of measures, trees planted at a later time would have a lower survival rate than those planted immediately following the wildfire (Sessions et al. 2004). Additionally, more snags may need to be cut down for safety reasons if reforestation activities are deferred. Weakened fire damaged trees would continue to die in the years following the wildfire.

The National Forest Management Act (NFMA) requires maintaining forest cover at certain levels in accordance with forest plans. The 2004 SNFPA FEIS ROD provides for ecosystem restoration following catastrophic events in all land allocations, including salvage of dead and dying trees and habitat restoration. Reforestation would promote the re-establishment of fire resistant, shade intolerant conifer species before shrub cover types dominate sites.

Reforestation strategies include considerations for vegetative diversity where it exists within the project area, especially to encourage Baker cypress and hardwoods and enhance meadow and riparian function. Shrubs, forbs, and grasses would become a component of planted areas and maintain vegetation diversity. Approximately 50 percent of the project area would be montane chaparral consisting of unburned and low fire severity chaparral and untreated burned/ barren areas that would become dominated by shrubs. Additional areas in proposed units would not be treated (like snag retention leave islands) to retain patches of standing dead trees and intact green vegetation, avoid riparian habitat, and leave dense areas of oak vegetation untouched.

*Tree Size and Density and Shrub Class Distribution:* Treatments would affect the conifer size and density class distribution in the project area and can be shown using the CWHR size and density classes. Post treatment CWHR size and density classes would be the same as pre-treatment CWHR classes except: (1) shrub and forested stands with high fire severity that became barren (CWHR = BAR) and are proposed for planting become seedling, size class 1, with an undetermined canopy cover for each cover type; and (2) shrub and forested stands with high fire severity that became CWHR = BAR and are not proposed for planting, like in the wilderness and IRA areas, are expected to become shrub dominated. Post-fire conditions were 20 percent forested and 80 non-forested. With Alternative 1, half of the area becomes forested.

### **Cumulative Effects**

Artificial regeneration with native conifer seedlings would allow for the return of forested cover in a much shorter time period than natural recovery would allow. Artificial regeneration would also affect future stand composition and structure. This could speed the recovery of habitat for forest dependent wildlife species. Sparsely treed mature forests, CWHR size and density classes 4P, 4S, 5P, and 5S, that are planted would develop into multi-storied forests with a component of understory vegetation.

Areas not treated would develop with natural regeneration of shrubs, grasses, forbs, and/or trees depending on local seed sources and presence of root sprouting species. Approximately 50 percent of the project area would consist of existing montane chaparral and untreated burned barren areas that would develop into shrub dominated vegetation cover. Shrub dominated areas would persist for an indefinite time and contribute to landscape diversity.

In hardwood and riparian community treatment areas, planting strategies would allow understory shrub and herbaceous communities to re-establish and increase coverage in future years. Hardwood regeneration would likely improve and help to promote long-term sustainability and resiliency of these stands.

Snag retention leave-islands left untreated would become dense pockets of understory species, especially shrub species and standing dead trees. Snags are expected to remain standing for 8 to 20 years (Ritchie et al. 2013), and will then fall to the ground and become down woody material. These will create pockets of heterogeneity in the future, providing a non-timbered aspect to the landscape.

Snag retention within helicopter units will be more dispersed. Founders stands will be planted in clearings created by the salvage. These pockets of trees will provide a timbered component to the landscape. Remaining snags that pose a threat to worker safety during reforestation would be felled and left.

## **Alternative 2**

### **Direct and Indirect Effects**

There would be no recovery of the economic value of any of the fire killed trees. Hazard trees adjacent to roads could be cut but not removed. Fuel loading within salvage units would increase as dead and dying trees eventually fall to the ground. Roads where hazard trees are not removed would continue to present a risk for members of the visiting public as well as Forest Service employees, contractors, and adjacent private landowners in those areas.

Without salvage and post-harvest reduction of small diameter fuels, there would be no decrease in future fuel loading, no decrease in the potential fire severity, and no increase in firefighters' safety. Fuel loading along roads would be high in areas and would detract from safe firefighting operations along project area roads.

Reforestation: Re-establishment of forest cover would rely on natural regeneration and could take decades or longer. Without reforestation efforts, high severity fire areas (69% of the project area) would recover primarily with shrubs, resulting in a continued loss of forest habitat for an indefinite period of time. Low and moderate fire severity areas (31% of the project area) with a component of live overstory trees would reseed with natural tree regeneration depending on timing of seed production and vegetation composition. Natural regeneration depends on adjacent seed sources and all species of a mixed conifer forest may not be well represented.

Tree Size and Density and Shrub Class Distribution: Under the No Action Alternative, there would be no increase in CWHR 1X (seedling size class of undetermined canopy cover) in all forest cover types. All

shrub and forest cover types that burned at high severity and became barren (CWHR=BAR) would regenerate to shrub cover such as montane chaparral. With no treatments, the Eiler Project area would have approximately 62 percent shrub cover with little to no tree regeneration. It is expected that tree distribution throughout all of the diameter ranges, as well as basal area, in areas of moderately-high to high fire severity would remain low for many decades.

### **Cumulative Effects**

Over time fuel loading would increase throughout the project area as trees die and snags fall over (Brown et al. 2003, McIver and Ottmar 2007, Ritchie et al. 2013). Heavy fuel loading can become a hindrance to fire suppression and standing snags can become a safety hazard. Standing snags can also contribute to fire behavior and fire spread by acting as a source of embers that can be lofted into the air and carried down wind, starting spot fires (van Wagtendonk 2006).

Low to moderate burn severity areas with surviving overstory trees would regenerate with tree seedlings and create multi-story stands. High fire severity areas would regenerate from root sprouting shrubs; shrub, grass, and forb seeds in the soil; and seeds from adjacent trees. Number of tree seedlings would vary depending on the closest seed source. Any tree seedlings that become established within competing shrubs would have slow initial growth rates for possibly 30 to 50 years (Nagel and Taylor 2005) before emerging above the chaparral canopy.

## **Alternative 3**

### **Direct and Indirect Effects**

Direct effects of the hazard tree treatment would be removal of hazards along publically traveled roads, increased safety for people using these roads, and utilization of forest products. Timber sales help support the forest product industries as well as the local communities that rely on revenue generated by forest products.

Without salvage and post-harvest reduction of small diameter fuels outside of the roadside hazard areas, there would be no decrease in future fuel loading, no decrease in the potential fire severity, and no increase in firefighters' safety.

All other effects are the same as those discussed under Alternative 2.

### **Cumulative Effects**

Same as Alternative 2.

# Economic Analysis

## Alternatives 1 and 3

### Direct and Indirect Effects

Table 7 displays the estimated volume and value from the proposed hazard tree and salvage treatments. Table 8 is a list of proposed post salvage treatments and associated costs within the salvage units and immediately adjacent hazard tree areas.

**Table 7. Estimated Total Timber Yield and Value for Action Alternatives**

Product	Total Volume	Total Value
<b>Alternative 1</b>		
Ground Salvage (sawlog tons) – inc. Hazard Tree	102,941	\$87,500
Helicopter Salvage (sawlog tons)	14,975	\$12,728
<b>Total</b>	<b>117,916</b>	<b>\$100,228</b>
<b>Alternative 3</b>		
Ground Salvage (sawlog tons) – Hazard Tree Only	26,637	\$22,641
<b>Total</b>	<b>26,637</b>	<b>\$22,641</b>

\* Total volume in green tons of trees greater than or equal to 10-inches diameter at breast height

**Table 8. Fuels Treatments, Site Preparation, and Reforestation Costs for Action Alternatives**

Activity	Total Future Costs
<b>Alternative 1</b>	
Mechanical Biomass Cut and Pile (517 ac)	\$359,315
Hand Fuels Treatments* (3,602 ac)	\$1,620,900
Site Preparation (5,645 ac)	\$1,411,250
Tree Planting (5,645ac)	\$2,258,000
Manual/Mechanical Seedling Release (5,645 acres)	\$1,919,300
Pile Burning (2,800 ac)	\$266,000
<b>Total</b>	<b>\$7,834,765</b>
<b>Alternative 3</b>	
Hand Cut and Pile (1,174 ac)	\$851,150
Pile Burning (1,174 ac)	\$111,530
<b>Total</b>	<b>\$962,680</b>

\* Does not include areas needing site preparation

The analysis predicted a **negative return for Alternatives 1 and 3**. Trust funds from the sale of timber would be used to partially fund post-harvest site preparation and reforestation activities. There would be an economic return of money to the community from associated harvesting activities, processing and sale of forest products, and from service contracts awarded to complete post-harvest activities. The post-

harvest treatments (Table 8) would be accomplished using trust funds from the sale of timber and appropriated money.

Employment opportunities can have direct, indirect, or induced effects on the local economy. Direct effects are associated with the primary producer. For example, the manufacturing of lumber from the Eiler Project has a direct effect on employment opportunities. Indirect effects account for employment in service industries that serve the lumber manufacturer. These industries may include logging, trucking, fuel supplies, etc. Induced effects are determined by wages. Wages paid to workers by the primary and service industries are circulated through the economy for food, housing, transportation, and other living expenses. The sum of direct, indirect, and induced effects is the total economic impact in terms of jobs. This typically ranges from 10 to 15 jobs per 2,000 CCF (13 jobs per 2,000 CCF or 13 jobs per 7,100 green tons for this analysis).

The sum of direct, indirect and induced effects is the total economic impact in terms of jobs. In addition to the direct employment that would result from the harvesting and fuel reduction treatments in Alternative 1, there would be some additional benefits to the local economy as wages earned by those employees are spent on living expenses. Alternative 1 would generate an estimated 216 jobs. Using a salary of \$51,000 per job, total employee related income would be approximately \$11,016,000. Alternative 3 would generate an estimated 49 jobs; with a total employee related income of approximately \$2,499,000. Table 9 shows the projected benefit to cost ratio for the action alternatives.

**Table 9. Project Benefit/Cost Ratio for Action Alternatives**

	<b>Benefit</b>	<b>Cost</b>	<b>Net Present Value</b>	<b>*Benefit/Cost Ratio</b>
<b>Alternative 1</b>	\$100,228	\$7,834,765	-\$7,734,537	0.013
<b>Alternative 3</b>	\$22,641	\$962,680	-\$940,039	0.024

\* 1.0 = break even; > 1.0 = positive return; < 1.0 = negative return

The action alternatives would provide timber yield tax, administered by the State Board of Equalization. This tax is not paid by the Forest but is paid by private timber operators and is based on the amount of timber harvested in a given year on both private and public lands. The tax is 2.9 percent of the value of the harvested timber. The taxes are collected by the state and approximately 80 percent is returned to the counties in which the timber was harvested.

The action alternatives would also provide Forest Reserve money to Shasta County in which the Eiler Project is located. The county would receive 25 percent of the revenues raised from the sale of timber to be used for county roads and public schools. For over 100 years this revenue sharing act has been providing revenues for rural counties and schools.

## **Cumulative Effects**

The action alternatives would result in a positive effect on local industries that depend on service contracts or a steady supply of forest products, as well as counties that use timber yield taxes to fund county programs. These local industries currently lack opportunities related to fuels reduction, site preparation, and timber harvest activities. The local economy would receive benefits from associated employment such as in food, lodging, and transportation businesses. The alternatives would have a positive effect on maintaining local infrastructure that is imperative to implementing future fuels reduction projects. The alternatives could provide additional opportunities for employment and rural community stability because reforestation activities could continue into the future.

The cumulative effects of the action alternatives would include increased overall economic activity in the local counties. Though it is not a requirement, it is assumed in this analysis that most products would be processed locally due to high hauling costs of products and equipment. It is also assumed that employment would be derived from Tehama, Plumas, Lassen, Butte, and other adjacent counties, as well as from other areas throughout northern California. The Eiler Project area revenue and service contract employment would complement other projects across the forest.

## **No Action Alternative**

Alternative 2 would result in a negative effect on local industries that depend on service contracts or a steady supply of forest products, as well as counties that use timber yield taxes to fund county programs. These local industries currently lack opportunities related to fuels reduction, site preparation, and timber harvest activities. The local economy would also not receive benefits from associated employment such as in food, lodging, and transportation businesses. Throughout northern California, cumulative years of reduced timber harvesting activities, particularly on federal lands, have resulted in the loss of infrastructure to complete such activities. The loss of infrastructure, including local mill closures, could significantly reduce or eliminate future economic and environmental opportunities on National Forest System lands. The continuation of current conditions under the No Action alternative would preclude opportunities for long-term employment and rural community stability because activities related to forest restoration would not occur.

# Fire and Fuels

## Alternative 1

The combined treatments under Alternative 1 would reduce snag densities, safety hazards, and the future fire hazard within the Eiler Project area. Reducing the basal area of snags would reduce the amount of down woody material, known as coarse woody debris (CWD), that accumulates and contributes to the surface fuel loading over time (Ritchie et al. 2013; Peterson et al. 2015). Treatments would reduce the vertical arrangement, horizontal continuity, and loading of the surface fuels. Combined, these changes would result in lower flame lengths, fireline intensities, and improved resistance-to-control throughout the project area. Fire behavior and fire severity would be reduced during any subsequent reburn of the area. A more detailed explanation of these indicators can be found in the project record in the Fire and Fuels Report.

**Table 10. Fire Behavior and Fire Effects by Alternative.**

	Years 1 – 5		Years 6 – 10		Years 11 - 20	
	Flame Length	Fireline Intensity	Flame Length	Fireline Intensity	Flame Length	Fireline Intensity
<b>Alternative 1</b>	0 - 3	2 - 53	1 - 4	6 - 114	1 - 5	6 - 215
<b>Alternative 2</b>	0 - 4	2 - 114	1 - 8	6 - 586	2 - 17	25 - 2520
<b>Alternative 3</b>	0 - 4	2 - 114	1 - 8	6 - 586	2 - 17	25 - 2520
<b>Desired Conditions: Direct Attack Suppression Methods</b>	≤ 4	≤ 100	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.			
	≤ 8	≤ 500	Fires are too intense for direct attack at the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and aircraft retardant can be effective.			
<b>Undesirable Conditions: Indirect Suppression Methods</b>	8 - 11	500 - 1000	Fires may present serious control problems such as torching, crowning, and spotting.			
	> 11	> 1000	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.			

Source: Fire behavior outputs from Behave Plus 5.0.5.

Flame lengths of around four feet can be directly attacked by hand crews and engines, allowing faster fire line construction and generally resulting in less total acreage burned, as well as safer conditions for firefighters. Table 10 summarizes the predicted flame lengths and fireline intensities following treatments, as well as the desired conditions.

Resistance-to-control is generally viewed as an estimate of the suppression force required for controlling a unit of fire perimeter. It is the relative difficulty of constructing and holding a control line as affected by resistance to line construction and fire behavior. Fire hazard including resistance-to control and fire behavior reach high to extreme ratings when downed CWD exceeds 30 to 40 tons per acre (Table 11). Excessive soil heating is likely at approximately 40 tons per acre and higher (Brown et al. 2003). After treatments the CWD is estimated to be approximately 5 to 15 tons per acre in the less than three inch size class, which correlates to reduced resistance-to-control.

**Table 11. Relationship of Fuel Loading to Resistance-to-Control**

0 to 3 Inch Diameter (Tons Per Acre)	3 to 10 Inch Diameter (Tons Per Acre)	
	High	Extreme
5	25	40
10	15	25
15	5	15

Source: Brown 2003.

The effects of the treatments would be successful in reducing flame lengths and fireline intensities to the desired levels, and improve resistance-to-control, which would allow firefighters to use direct attack methods on fires occurring within the proposed treatment areas.

**Cumulative effects** for Alternative 1 include safer access to the area due to the hazard tree removal along main roads and ML2 roads in this project. In addition, fuels treatments would improve the safety for all users. The treatment of CWD and smaller fire-killed vegetation would result in a reduction in fire behavior, fire effects, and resistance-to-control, thereby increasing safety during a wildfire event. Reduced fire behavior would allow suppression forces to take appropriate action and use direct attack methods. Fire spread on public lands would be altered, reducing the chance of fire spreading between the public and private lands interface.

The combined effects of these proposed treatments would increase the ability of fire suppression personnel to both safely and effectively limit the size and severity of wildland fires, while allowing for the reintroduction of fire into these areas under more moderate weather conditions. Firefighter safety would be improved with the removal of the overhead snags as they pose one of the greatest hazards to firefighters. Suppression efficiency would be improved within the treatment areas by creating an environment where wildfires would burn at lower intensities and where firefighting production rates would be increased because less ground fuels would need to be cleared for fireline construction and backfiring operations. Treated areas would provide a safer and more efficient environment for fire crews to stop wildland fires that could potentially spread and destroy private property, communities, watersheds, and wildlife.

## Alternative 2 and Alternative 3

Under Alternative 2, none of the activities proposed under Alternative 1 would be implemented. Hazard tree felling could occur along roads currently open to the public, trails, and developed recreation sites. These hazard trees could be felled and left in place. For Alternative 3, hazard tree removal would occur along 32 miles of roads. Commercial sized hazards would be felled and removed. Sub-merchantable hazards would be felled and left in place or piled and burned. From fuels management perspective, as it relates to fuels and fire behavior reduction, there is very little difference in cumulative the effects between the actions occurring for Alternative 2 and Alternative 3. Therefore, the cumulative effects for Alternative 3 are considered to be identical to Alternative 2.

Existing stand conditions would persist and develop unaltered by active management. Down woody material would continue to accumulate at a rate that is greater than decomposition, contributing to the surface fuel layer. Standing snags would persist and the site would be rapidly colonized by grasses, forbs, and shrubs (Russell et al. 1998; Collins and Roller 2013), which can further add to hazardous surface fuel conditions (Albini 1976). These surface fuel conditions can leave recently burned areas prone to repeat fire in relatively short succession (5 to 15 years) (Coppoletta, personal communication, 2015). Both grass-forb cover and shrub cover present formidable competition for water and light with naturally established seedlings. Large areas of untreated burned trees would exist. Brush intermixed with grass, forbs, and standing snags would dominate these areas. These snags would eventually fall, resulting in brush fields with high surface fuel loads arranged in a jackstraw pattern. Over time, this fuel is expected to increase each decade as trees fall over. Surface fuels are projected to be well over 100 tons per acre, increasing the resistance-to-control, and ultimately increasing the potential for a high severity reburn and high severity fire effects. In the event of a wildfire this would create serious control problems, high suppression costs, and high volumes of smoke emissions.

Under Alternative 2 and Alternative 3, flame lengths could exceed four feet after five years and are projected to exceed 10 feet within 20 years. Fireline intensities could exceed 500 Btu/ft/sec in six to 10 years and are projected to exceed 1,000 Btu/ft/sec after 10 years. Resistance-to-control would be high within the first 10 years and extreme after 20 years. These increased flame lengths, fireline intensities, and resistance-to-control are a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions are expected to result in serious control problems. Fires would be too intense for direct attack on the head by persons using hand tools, heavy equipment, and aircraft retardant. Firelines may not be relied on to hold the fire. Access to areas in the project would be inhibited by hazard trees and downed logs. Firefighter's safety would not be improved due to the remaining density of snags and overhead hazards in the area. Fires would present serious control problems like torching out, crowning, and spotting. Firefighters would have to employ indirect suppression methods. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Associated smoke from a large, intense wildland fire could create both nuisance and health concerns in nearby communities for considerable durations (days or

weeks). Under Alternative 2 and Alternative 3, the increased flame lengths, fireline intensities, and resistance-to-control would be expected to continue and become more problematic in the future.

As snags continue to fall, the surface fuel loading throughout the project area would continue to increase. Increased surface fuels would result in increased flame lengths, fireline intensities, and resistance-to-control problems thus leading to increased firefighter risk. Lives, property, and natural resources in and around the Eiler Project area would continue to be at risk from future wildland fires that have the potential to be both large in size and damaging to the ecosystem well beyond the scope of what has occurred in this area historically. In the event of a wildland fire in the project area, under future fuel loading conditions and 90<sup>th</sup> percentile fire weather, large-scale loss of key ecosystem components would result. Twenty years in the future, these conditions would be more pronounced without some type of fuels reduction treatment to reduce the fire hazard in the area. The cumulative effects of Alternative 2 and Alternative 3 would create an increase in fire behavior over time and negative fire effects on the landscape.

## **Air Quality**

### **Alternative 1**

The Eiler Project area is located north of a Class One Airshed, the Thousand Lakes Wilderness. The community of Hat Creek lies on the eastern side of the project area and Burney is to the north of the project area. The project area is located in the Shasta County Air Quality District and is part of the Northeast Plateau Air Basin.

Under Alternative 1, there would be areas where piles would be burned and areas where broadcast burning treatments would occur. These areas would be treated as part of the district's prescribed fire program and, as such, all burning would be take place on permissive burn days. Depending on weather conditions and timing of other projects, it could take between three to five years to treat these areas following completion of the salvage harvest and area fuel treatments. Broadcast burning would take place in the fall and spring. Handpiles and machine piles would be burned in the fall-winter burn season. Currently, Shasta County meets National Ambient Air Quality Standards (NAAQS).

Treatment of fuels under Alternative 1 would result in decreased smoke production and associated emissions in the event of a wildland fire. This decrease in emissions would help to reduce smoke related impacts to nearby communities. Short-term impacts from smoke and associated particulate matter from the proposed prescribed fire treatments, combined with emissions from other vegetation burning on public and private land, is possible. However, as discussed earlier, these possible impacts would be mitigated by adherence to the SMP and CARB. In addition to these safeguards, a daily Air Quality Conference Call is conducted during the prescribed fire season. They are attended by representatives of the Air Quality Management Districts, the California Air Resources Board, Geographical Area Coordination Center meteorologists, and agencies that are conducting prescribed fire operations. These calls help ensure that burning only occurs when atmospheric conditions are conducive to good smoke dispersion and that the

cumulative effects of all prescribed burning remain at levels that are within the provisions of the Clean Air Act.

Fugitive dust could result from salvage harvest operations such as skidding and hauling during dry seasons. This would be mitigated by standard contract requirements for road watering or other dust abatement techniques.

Past actions affecting air quality for the past five years in the area include the burning of some machine piles and miscellaneous handpiles on both federal and private lands. This burning occurred on permissive burn days. There has also been some dust created in the area from hunting, fire wood gathering, and other recreational uses. Due to the fact that wind events and storms take place (and move or remove the particulates from the air) the impacts from smoke events are short term (less than two weeks). There have been no large fires in the project area, but in 1999, 2000, 2002, 2008, and 2009, the air quality was impacted from large fires burning elsewhere in northern California and Oregon. These smoke events, depending on the prevailing winds and the high pressure system aloft, lasted from two to three days to one to two weeks. Again, due to the westerly flow of winds and precipitation events dispersing the smoke, there were no cumulative impacts from smoke.

Alternative 1 would not increase the amount of prescribed fire activities in the area above what has been implemented for the last five years and would not impact the air quality of the area, when combined future actions, beyond what has occurred during this time.

## **Alternative 2 and Alternative 3**

Alternative 2 would not create any short-term impacts to the local areas from prescribed fire. Alternative 3 could create short-term impacts from pile burning along roads. The air quality within the project area would remain within national and state levels for visibility, particulate levels, and pollutants. The project area's air quality could be affected by pollutants from downwind population centers such as the city of Redding, agriculture, by adjacent private forest activities producing seasonal dust and smoke, as well as by recreational activities using dirt roads in and around the project area.

However, as surface fuel loadings increase over time, the risk of a major air quality impact from a large wildland fire burning in the area would be increased under Alternative 2 and Alternative 3. The amount of smoke created, in the event of a large wildland fire burning in the project area, could be increased for several reasons. There could be more acres burned in a shorter period of time and the fire would burn under hotter and drier conditions. Therefore, the amount of fuel consumed would increase and fuels would burn that would otherwise have been removed under Alternative 1.

Additionally, smoke impacts to local communities would be more severe in the event of a wildland fire due to the normal summertime inversions. Inversions cause smoke to linger near the surface in low-lying areas and can last for extended periods (2-3 weeks), especially during summertime conditions.

Summertime inversions have negatively impacted the area during years when large wildland fires have burned in northern California, including 1987, 1992, 1999, 2000, 2002, 2008, and 2009.

## **Management Indicator Species (MIS)**

The MIS whose habitat would be either directly or indirectly affected by the action alternatives of the Eiler Project and that were analyzed in the MIS report were: California spotted owl, American marten, northern flying squirrel, hairy woodpecker and black-backed woodpecker.

Summaries of the analyses of potential effects of the action alternative on analyzed MIS species and their habitats are provided below.

### **California spotted owl, northern flying squirrel, American marten:**

**Alternative 1:** Prior to the Eiler Fire, approximately 1,082 acres of late seral, closed canopy coniferous forest existed within the footprint of the fire across all ownerships. Approximately 179 acres of this total burned at severities of less than 50 percent, representing about 16 percent of the pre-burn total. As a result of proposed actions on both USFS and other ownership, cumulatively there would be reduction in snags and/or downed logs on approximately 141 acres of the combined 179 acres of late seral closed canopy forest that remain after the fire. This represents 79 percent of the 179 acres within the analysis area. The majority of the acres that may be affected (132 of the 141 acres) would be on non-USFS lands. The proposed action would retain late seral closed canopy coniferous forest habitat but may affect some of the habitat elements, such as snags and downed logs. Past, present, and future actions would not be expected to cause a change in the amount of late seral closed canopy coniferous forest habitat. The proposed action is not expected to add cumulatively to the reduction in habitat and therefore the proposed project would not alter the existing trend in the habitat.

**Alternative 2:** As a result of hazard tree abatement on USFS lands and actions on other ownership, cumulatively there would be reduction in snags and/or downed logs on approximately 133 acres of the combined 179 acres of late seral closed canopy forest that remain after the fire. This represents 74 percent of the 179 acres within the analysis area. The majority of the acres that may be affected (132 of the 133 acres) would be on non-USFS lands. Past, present, and future actions would not be expected to cause a change in the amount of late seral closed canopy coniferous forest habitat. This alternative would not be expected to add cumulatively to the reduction in habitat and therefore would not alter the existing trend in the habitat.

**Alternative 3:** As a result of hazard tree abatement on USFS lands and actions on other ownership, cumulatively there would be reduction in snags and/or downed logs on approximately 133 acres of the combined 179 acres of late seral closed canopy forest that remain after the fire. This represents 74 percent

of the 179 acres within the analysis area. The majority of the acres that may be affected (132 of the 133 acres) would be on non-USFS lands. Past, present, and future actions would not be expected to cause a change in the amount of late seral closed canopy coniferous forest habitat. This alternative would not be expected to add cumulatively to the reduction in habitat and therefore would not alter the existing trend in the habitat.

### **Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends**

**California spotted owl.** As a result of the proposed actions in Alternative 1 of the Eiler Project, combined with effects on private lands, a decrease in snags and downed logs would be expected on approximately 141 of the 179 acres of late seral, closed canopy coniferous forest. This projected reductions at habitat components within these 141 acres, out of the greater than 1,000,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands currently estimated to exist in the Sierra Nevada would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of California spotted owl across the Sierra Nevada bioregion.

**American marten.** As a result of the proposed actions in Alternative 1 of the Eiler Project, combined with effects on private lands, a decrease in snags and downed logs would be expected on approximately 141 of the 179 acres of late seral, closed canopy coniferous forest. This projected reductions at habitat components within these 141 acres, out of the greater than 1,000,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands currently estimated to exist in the Sierra Nevada would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of American marten across the Sierra Nevada bioregion.

**Northern flying squirrel.** As a result of the proposed actions in Alternative 1 of the Eiler Project, combined with effects on private lands, a decrease in snags and downed logs would be expected on approximately 141 of the 179 acres of late seral, closed canopy coniferous forest. This projected reductions at habitat components within these 141 acres, out of the greater than 1,000,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands currently estimated to exist in the Sierra Nevada would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of northern flying squirrel across the Sierra Nevada bioregion.

### **Hairy woodpecker:**

**Alternative 1:** After the Eiler Fire, approximately 4,551 acres of the snags in green forest ecosystem component existed within the footprint of the fire across all ownerships. As a result of proposed actions on both USFS and other ownership, cumulatively there may be reduction in snags and/or downed logs on approximately 3,218 acres of these acres. This represents 71 percent of the 4,551 acres within the analysis area. The majority of the acres that may be affected would be on non-USFS lands.

**Alternative 2:** After the Eiler Fire, approximately 4,551 acres of the snags in green forest ecosystem component existed within the footprint of the fire across all ownerships. As a result of proposed actions on both USFS and other ownership, cumulatively there may be reduction in snags and/or downed logs on approximately 3,011 of these acres. This represents 66 percent of the 4,551 acres within the analysis area. The majority of the acres that may be affected would be on non-USFS lands.

**Alternative 3:** After the Eiler Fire, approximately 4,551 acres of the snags in green forest ecosystem component existed within the footprint of the fire across all ownerships. As a result of proposed actions on both USFS and other ownership, cumulatively there may be reduction in snags and/or downed logs on approximately 3,011 of these acres. This represents 66 percent of the 4,551 acres within the analysis area. The majority of the acres that may be affected would be on non-USFS lands.

### **Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend**

Due to the proposed action of the Eiler Fire Salvage and Restoration project, combined with actions non-USFS lands, there would be an expected change in medium and large snags on about 4,551 acres of this ecosystem component within the Eiler Fire analysis area. This includes about 327 acres on USFS lands and about 2,891 acres on non-USFS lands. The change in medium to large-sized snags per acre on 3,218 acres out of approximately 4,551 acres of this ecosystem component in the Eiler Fire Salvage and Restoration Project analysis area would not alter the existing trend in the ecosystem component, nor would it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion, given the ubiquity of this ecosystem component across the bioregion.

### **Black-backed woodpecker:**

**Alternative 1:** Combined, about 7,057 acres of burned forest black-backed woodpecker habitat existed on both USFS and non-USFS lands within the Eiler Fire perimeter. Due to salvage harvest, it was assumed that about 2,203 acres of this habitat on non-USFS lands would be lost. On USFS lands, tractor harvest proposed under Alternative 1 would cause a loss of about 1,505 acres. Helicopter harvest would affect 320 acres, but these acres would still provide habitat post-harvest. Approximately 3,029 acres on USFS lands would not be impacted by treatments. Thus, actions across ownerships within the fire perimeter would cause approximately 3,708 acres of the 7,057 acres (about 52%) to be lost, leaving approximately 3,349 acres available as burned forest black-backed woodpecker habitat.

**Alternative 2:** Combined, about 7,057 acres of burned forest black-backed woodpecker habitat existed on both USFS and non-USFS lands within the Eiler Fire perimeter. Due to salvage harvest, it was assumed that about 2,203 acres of this habitat on non-USFS lands would be lost. On USFS lands, hazard tree abatement and personal fuelwood harvest may combine to remove or alter about 396 acres of habitat along roadside corridors. Thus, under Alternative 2, actions across ownerships within the fire perimeter may cause approximately 2,599 acres of the 7,057 acres (about 37%) to be lost, leaving approximately 4,458 acres available as burned forest black-backed woodpecker habitat.

**Alternative 3:** Combined, about 7,057 acres of burned forest black-backed woodpecker habitat existed on both USFS and non-USFS lands within the Eiler Fire perimeter. Due to salvage harvest, it was assumed that about 2,203 acres of this habitat on non-USFS lands would be lost. On USFS lands, hazard tree abatement and personal fuelwood harvest would likely combine to remove about 396 acres of habitat along roadside corridors. Thus, under Alternative 3, actions across ownerships within the fire perimeter would cause approximately 2,599 acres of the 7,057 acres (about 37%) to be lost, leaving approximately 4,458 acres available as burned forest black-backed woodpecker habitat.

### **Relationship of Project-Level Habitat Impacts to Bioregional-Scale Black-Backed Woodpecker Trend.**

Due to the proposed action of the Eiler Fire Salvage and Restoration project, combined with actions on non-USFS lands, there would be a loss of approximately 3,710 acres (52%) of the 7,059 acres of burned forest black-backed woodpecker habitat created by the Eiler Fire, leaving approximately 3,349 acres (48%) available as burned forest habitat. Of the acres estimated to be lost, approximately 2,205 acres would be due to actions on non-USFS lands, and about 1,505 acres on USFS lands would be impacted by treatments on USFS lands. This reduction of less than 4,000 acres of burned forest black-backed woodpecker habitat would not alter the existing trend in this ecosystem component, nor would it lead to a change in the distribution of black-backed woodpecker across the Sierra Nevada bioregion, given that from 2006 to 2013 wildfires created an estimated 168,761 acres of burned forest, black-backed woodpecker habitat.

## **Threatened, Endangered, and Sensitive (TES) Wildlife Species, Terrestrial and Aquatic**

Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it was determined the action alternatives would have no effect on the following Federally Listed or Proposed threatened or endangered species or their critical habitat: gray wolf, Pacific fisher, northern spotted owl, valley elderberry beetle, Central Valley steelhead DPS, Central Valley chinook salmon ESU, Delta smelt, winter-run chinook salmon ESU, California red-legged frog, Sierra Nevada yellow-legged frog, Shasta crayfish, conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and giant garter snake.

Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it was determined that the action alternatives would have no effect on the following Forest Service Sensitive species: Northern bald eagle, California wolverine, Sierra Nevada red fox, Townsend's big-eared bat, great gray owl, willow flycatcher, greater sandhill crane, yellow rail, Shasta hesperian snail, foothill yellow-legged frog, Cascade frog, northwestern pond turtle, California floater, Great Basin rams-horn, scalloped juga, topaz juga, montane peacclam, nugget pebblesnail, black juga, kneecap lanx, Goose Lake redband trout, hardhead, Pacific lamprey, and Eagle Lake rainbow trout.

Sensitive species analyzed in detail for the Eiler Fire Salvage and Reforestation were northern goshawk, California spotted owl, American marten, pallid bat, fringed myotis and western bumble bee. Summaries of the analyses of effects of the action alternatives for these species are given below.

## **Northern goshawk**

**Alternative 1:** The Eiler Fire rendered a large area unsuitable as goshawk nesting habitat due to the high severity nature of the fire and the loss of dense canopied, mature forest. Included was the loss, due to large patches of high severity fire, of two known goshawk nest territories. The salvage treatments under the proposed action may cause minor short-term reductions in foraging opportunities for northern goshawks, but in combination with tree planting would enhance the re-establishment of forest conditions in the long-term. The degree of the short-term effects would be minimized to some extent by the snag retention, large woody debris guidelines and consideration for the retention of understory vegetation and other vegetative communities within treatment areas. Based on analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of northern goshawks, but is not likely to result in a trend towards federal listing or loss of species viability.

**Alternative 2:** Analyses of direct, indirect and cumulative effects indicated that no direct effects to current habitat conditions that would result from this alternative. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Indirect and cumulative effects include a continuation of current vegetative trends across the analysis area. No substantive direct reduction in goshawk habitat quality on USFS lands within the project area would occur. Densification of stands, and surface and ladder fuel loading throughout the project area would continue to increase, and goshawk habitat in and around the Eiler Fire Salvage and Reforestation area would continue to be at risk from wildland fires.

**Alternative 3:** In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along 1,095 acres of roadside corridors would be removed or pile and burned. Vegetation would go through natural recovery and there would be little potential for disturbance to foraging goshawks. Existing levels of large woody debris and snags would be maintained, and may provide short-term foraging opportunities to the northern goshawk, particularly adjacent to suitable, unburned forest habitat. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to initiate natural reforestation. Due to the lack of reforestation on USFS lands, private land reforestation efforts within the Eiler Fire would gain importance as a means of hastening the restoration of forest cover and goshawk habitat within the footprint of the fire, and goshawk habitat in and around the Eiler Fire Salvage and Reforestation area would continue to be at risk from wildland fires.

Given the results of these analyses, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of northern goshawks, but is not likely to result in a trend towards federal listing or loss of species viability.

## **California spotted owl**

**Alternative 1:** The Frenner Peak owl PAC within the southern portion of the fire burned primarily at high severities. The nest location and surrounding stands also burned at high severity. However, the design of this project was in part based on the assumption that owls will continue to occupy the site, and salvage harvests and fuels reduction activities were minimized in proximity to the activity center location. The proposed action is consistent with the recommendations from Bond et al (2009), other than the approximate 21 acres of hazard tree removal. In addition, the proposed action would not substantively affect owl habitat associated with two activity centers located to the west of the fire perimeter. Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and, as a result, the high proportion of lands burned at high severity. Treatments proposed within the Eiler Fire Salvage and Restoration Project will not substantively add to these effects to spotted owls and their habitat within the fire footprint due to project design features that restricted almost all actions within one mile of known activity centers, and due to the lack of spotted owl activity centers within the interior of the fire footprint. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive. Outside the fire footprint, within the larger cumulative effects analysis area, reasonably foreseeable future treatments associated with the Whittington Project would further add to the cumulative effects to owl habitat within the larger cumulative effects analysis area given the changed condition created by the Eiler Fire itself.

Given the results of the analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of California spotted owls, but was not likely to result in a trend towards federal listing or loss of species viability.

**Alternative 2:** In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with fuelwood activity largely confined to roadsides or other accessible areas. Such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and burned-area vegetation would go through natural recovery. As such, there would be little potential for disturbance to foraging spotted owls. Also, because no roads enter the PAC associated with the Frenner Peak PAC, no hazard tree removal or fuelwood harvest would affect this

area. Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions to the footprint of the fire. Cumulative effects to California spotted owls from the Whittington Project would be the same as described for Alternative 1.

**Alternative 3:** In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being commercially removed, and smaller diameter trees within these corridors may be piled and burned. Logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with fuelwood activity largely confined to roadsides or other accessible areas. Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions to the footprint of the fire. Given the results of the analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of California spotted owls, but was not likely to result in a trend towards federal listing or loss of species viability.

## **American marten**

**Alternative 1:** Prior to the fire, approximately 3,358 acres of CWHR 4M, 4D, 5M and 5D existed within mixed-conifer, white fir and red fir forest types. Most of this habitat was in the southern portion of the fire within the Thousand Lakes Wilderness and Inventoried Roadless Area, and on the eastern slopes of Burney Mountain. The Eiler Fire reduced the amount of this habitat to about 240 acres, which represents about a 93 percent reduction of this habitat.

Only minimal treatments would occur with the proposed action in the southern portion of the fire within the Wilderness and the adjacent Inventoried Roadless Area. There would be no actions within the Roadless Area, and within the Wilderness only the abatement of hazard trees along trails or camp sites. Therefore, this area of known marten habitat would be only slightly affected by the proposed action.

On Burney Mountain, marten habitat burned primarily at high intensities and what green forest remains is highly fragmented and in small patches. Due to lack of access and steep slopes helicopter salvage harvest is proposed for about 434 acres in this area, plus one 30 acre unit proposed to be harvested by on-the-ground machinery. During the planning process, another 270 acres of burned forest were dropped from proposed helicopter logging in this area in order to provide burned forest habitat. As per project design, the areas proposed for helicopter harvest would retain about 100 square feet of snag basal area per acre in diameters over 10" DBH, as well as the available snags <10" DBH. While the very largest trees in these helicopter units would be harvested, an abundance of snags would remain as habitat. While harvest would affect the quality of habitat within the Burney Mountain area due to removal of the largest snags, at least seasonal use by marten would still likely occur. Reluctance of marten to use these large burned areas may still occur in time regardless of the limited salvage harvest given the potential lack of overhead cover after

the burned snags fall due to decay. The proposed action would also return patches of conifers to this area more quickly than would occur in either Alternative 3 or the No Action alternative.

Given the lack of marten detections within the interior of the fire, the small, fragmented nature of low to moderately burned habitat, and the large areas of private lands that were burned at high intensities that surround USFS parcels within the fire interior, potential use of USFS lands within the fire interior by marten is not likely other than as possible short-term dispersal habitat. Given a very small amount of management actions proposed within areas important for marten, and the general lack of habitat within the interior of the fire on USFS lands even prior to the fire, this alternative and its design features should not represent a substantive effect to marten habitat within the fire area.

Reasonably foreseeable future treatments associated with the Whittington Project would further add to the cumulative effects to marten habitat and marten connectivity within the larger cumulative effects analysis area given the changed condition created by the Eiler Fire. The potential of future thinning, DFPZ and group selections treatments within the bottleneck of the least-cost pathways corridor as well as the LRMP-designated network of habitat management areas and connecting corridors could, along with the Eiler Fire itself, serve to cumulatively decrease the connectivity of marten habitat within this area outside of the fire footprint.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. Treatments proposed within the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to American marten and their habitat due to the project avoiding substantive effects to areas within the fire important to marten (Burney Mountain and the southern portion of the fire). Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands would not represent substantive cumulative effects. The primary impacts to marten habitat were caused by the Eiler Fire itself. Given the results of the analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of American marten, but was not likely to result in a trend towards federal listing or loss of species viability.

**Alternative 2:** In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags within the fire perimeter would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in the overall total of burned forest habitat, with most of the fuelwood activity confined to roadsides or other accessible areas. Such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres, snags would remain until they toppled due to decay, and burned-area vegetation would go through natural recovery. As such, there would be little potential for disturbance to foraging marten.

Most of the current levels of large woody debris and snags would be maintained on USFS lands, and may provide enhanced short-term foraging opportunities for marten, at least in the summer season. Natural

regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to seed back in to initiate natural reforestation.

Due to the lack of reforestation on USFS lands, reforestation efforts on private lands would take on a more important role in restoring forested conditions to the footprint of the fire on private lands, and hastening a return of forested cover within the footprint of the fire. For marten this would not be as important of a factor as for other species since much of the area of private land is outside of areas predicted as high suitability marten habitat, but these plantations, once mature, could provide for greater connectivity through this area.

The potential cumulative effects of the adjacent Whittington Project would remain as described for Alternative 1.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand outside the Eiler Fire footprint and cause a further loss of marten habitat outside of the Eiler Fire perimeter, and possibly further constrain marten connectivity in this area.

**Alternative 3:** In this alternative, similar to the No Action, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Within approximately 1,095 acres of roadside corridors, saw-timber sized hazard trees along roads would be felled and commercially removed, while submerchantable trees along roads may be felled and left as logs or piled and burned. Hazard tree abatement would thus cause a minor reduction in the overall total of burned forest habitat on USFS lands within the Eiler Fire. Relatively few of the 14,926 burned acres on USFS lands would be affected. Over the majority of the burned acreage snags would remain until they toppled due to decay. Given the restriction of timber harvest to road corridors, there would be little potential of disturbance to foraging marten. Due to the lack of reforestation activities, burned-area vegetation would go through natural recovery; in terms of vegetative recovery this alternative would be the same as the No Action. Natural regeneration would be expected to take much longer as compared to the proposed action to re-establish forested conditions in the project area, especially given the very large patch size of high severity fire in which no conifer seed source would be available to seed back in to initiate natural reforestation. Existing levels of large woody debris and snags would be maintained outside of road corridors, and may provide enhanced short-term foraging opportunities to marten, particularly adjacent to suitable, unburned forest habitat.

Within the cumulative effects analysis area, the existing condition was created by the effects of the Eiler Fire and the high proportion of lands burned at high severity. The limited treatments proposed within this alternative of the Eiler Fire Salvage and Restoration Project would not substantively add to these effects to American marten and their habitat. Within the fire footprint, on-going projects such as salvage harvest on private lands and fuelwood harvest on USFS lands will represent cumulative effects, but would not be substantive. The cumulative effects of the Whittington Project would be as described for Alternative 1, and the lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

Given the results of the analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of American marten, but was not likely to result in a trend towards federal listing or loss of species viability.

## **Pallid bat**

**Alternative 1:** Bats, including pallid bat, have been shown to respond positively to wildfire, including high-severity wildfire. Observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags.

The ecological importance of fire-created snag habitat and early seral forest stages were recognized in the design of this alternative. As a result, multiple design features were built into this alternative in order to balance the retention of these features while still meeting multiple-use objectives on FS lands burned by the Eiler Fire. The design features related to snag retention and reforestation would serve to retain many of the features that are thought to make burned areas valuable as bat habitat (snags, and an abundant understory vegetation leading to an increase in insects), while still allowing multiple-use objectives to be met within the burned area. While salvage operations and removal of fire-killed trees would reduce habitat for potential prey species such as wood-boring and bark beetles, the combination of snag retention and unharvested areas, as well as the increase in understory vegetation would still provide for greater insect prey abundance than what likely occurred pre-fire.

Due to snag habitat being considered during the planning and design of actions on USFS lands and given the proposed action and its consideration of the value of understory vegetation in its design, salvage harvest and reforestation efforts on private lands within the Eiler Fire perimeter should not represent substantive cumulative effects to this species or its habitat.

As a result of analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of pallid bats, but were not likely to result in a trend towards federal listing or loss of species viability.

**Alternative 2:** In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags would be subject to being removed as fuelwood by woodcutters. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. However such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would all remain unaffected in this alternative, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1, and similarly to Alternative 3.

Given the large patches of high severity fire within the interior of the Eiler Fire, the lack of reforestation activities of the No Action would substantially delay a return of forest cover to these burned areas that are distant to an existing conifer seed source. As such, there would be a substantial delay in this alternative in achieving a new cohort of trees and thus future roost trees over a large expanse of USFS lands within the fire footprint.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint. Depending on the severity and size of such fires, this potential could represent a benefit to this species and its habitat.

**Alternative 3:** In this alternative hazard trees along approximately 1,095 acres of roadside corridors that are of sawtimber size would be felled and commercially removed, and sub-merchantable trees may be piled and burned or left in place. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. Compared to Alternative 2, the felling and removing as well as potential pile burning would cause a greater disturbance to or reduction in understory vegetation due to the effects of burn piles and the creation of landings for the processing of trees for removal. However such activities would affect approximately 1,095 acres, a small proportion of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may

result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would remain unaffected in this alternative on about 93 percent of the burned area on USFS lands, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1.

Given the large patches of high severity fire within the interior of the Eiler Fire, the lack of reforestation activities of the No Action would substantially delay a return of forest cover to these burned areas that are distant to an existing conifer seed source. As such, there would be a substantial delay in this alternative in achieving a new cohort of trees and thus future roost trees over a large expanse of USFS lands within the fire footprint.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2. No substantive cumulative effects were identified.

Therefore, based on analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of pallid bats, but were not likely to result in a trend towards federal listing or loss of species viability.

## **Fringed myotis**

**Alternative 1:** Bats, including fringed myotis, have been shown to respond positively to wildfire, including high-severity wildfire. Observations of increased bat activity after disturbance (such as timber harvest, thinning or prescribed fire) could be related to decreased amount of clutter in the forest canopy, increased abundance of insect prey, or increased quantity and/or quality of roost habitat as a result of trees killed or damaged by fire. The Eiler Fire accomplished all three of the above factors: it reduced clutter, it will increase insect abundance within the burned footprint, and it resulted in thousands of acres of snags. The ecological importance of fire-created snag habitat and early seral forest stages were recognized in the design of this alternative. As a result, multiple design features were built into this alternative in order to balance the retention of these features while still meeting multiple-use objectives on FS lands burned by the Eiler Fire. The design features related to snag retention and reforestation will serve to retain many of the features that are thought to make burned areas valuable as bat habitat (snags, and an abundant understory vegetation leading to an increase in insects), while still allowing multiple-use objectives to be met within the burned area. While salvage operations and removal of fire-killed trees would reduce habitat for potential prey species such as wood-boring and bark beetles, the combination of snag retention and unharvested areas, as well as the increase in understory vegetation would still provide for greater insect prey abundance than what likely occurred pre-fire.

Due to snag habitat being considered during the planning and design of actions on USFS lands and given the proposed action and its consideration of the value of understory vegetation in its design, salvage harvest and reforestation efforts on private lands within the Eiler Fire perimeter should not represent substantive cumulative effects to this species or its habitat.

Therefore, based on analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of fringed myotis, but was not likely to result in a trend towards federal listing or loss of species viability.

**Alternative 2:** In this alternative, there would be no substantive reductions in burned forest habitat on USFS lands as a result of management activities. Hazard trees along approximately 1,095 acres of roadside corridors would be subject to being felled and left in place as downed logs. Such logs and accessible snags would be subject to being removed as fuelwood by woodcutters. Due to the proposed removal of hazard trees along roads, the majority of the snags that would be accessible to woodcutters would be felled anyway by this alternative. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. However such activities would affect relatively few of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would all remain largely unaffected in this alternative, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1, and similarly to Alternative 3.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint. Depending on the size and severity of such a fire, this potential could be a benefit for this species.

**Alternative 3:** In this alternative, hazard trees along approximately 1,095 acres of roadside corridors that are of sawtimber size would be felled and commercially removed, and sub-merchantable trees may be piled and burned or left in place. Both activities would cause a minor reduction in understory vegetation within the localized areas affected. Compared to Alternative 2, the felling and removing, as well as potential pile burning, would cause a greater disturbance to or reduction in understory vegetation due to the effects of burn piles and the creation of landings for the processing of trees for removal. However such activities would affect approximately 1,095 acres, a small proportion of the 14,926 burned acres on USFS lands. Over the majority of the burned acres snags would remain until they toppled due to decay, and vegetation would go through natural recovery. As a result, the factors created by wildfire that may result in increased bat activity (reduced clutter, increased insect production and increased snag availability) would remain unaffected in this alternative on about 93 percent of the burned area on USFS

lands, which would sustain these factors in greater amounts and for longer into the future than would Alternative 1.

The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2. No substantive cumulative effects were identified.

Therefore, based on analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of fringed myotis, but was not likely to result in a trend towards federal listing or loss of species viability.

## **Western bumblebee**

**Alternative 1:** Generally, management actions or events that increase the diversity and abundance of flowering plants on the landscape would tend to benefit western bumble bees and other pollinator species. The Eiler Fire, by causing widespread mortality to forested stands and thus increasing understory vegetation on 14,926 acres of USFS lands, will result in a greater abundance and variety of flowering plants compared to what existed prior to the fire. This greater abundance and diversity in floral resources should benefit western bumble bees as well as other pollinator species.

Due to fire salvage harvest occurring so quickly after the fire, relatively little flowering plant life would be expected to occur within treatment units during the first spring and early summer after the fire as compared to subsequent years. There may be some disturbance to foraging individuals due to project activities, but there is likely little potential for direct mortality. Due to the highly mobile nature of this species, there would be little potential for direct effects of the proposed activities to this species.

Of the proposed post-fire activities, the action that would have the greatest long-term effects to western bumble bees would be reforestation activities. However, the proposed action recognized the value of understory vegetation that is promoted and increased by wildfire, and took this value into account when designing reforestation. For example, conventional reforestation with wide spacing, cluster planting and the establishment of founder stands were all designed to retain understory vegetation within the units planted to these methods. In addition, planting densities would generally be lower and trees more widely spaced in areas containing black oaks, and conifers would not be planted within 20 feet of live black oak tree crowns, including sprouts greater than three feet tall. Also, reforestation of conifers would not occur within 150 feet of aspen and cottonwood communities on the east, south, and west sides of the community, or 100 feet on the north side to maximize light to the stand and allow for expansion. Reforestation would not occur within 50 feet of the meadow edge, and when along stream channels and seasonal wetlands with existing riparian communities, reforestation of conifer species would not occur within 20 feet of the riparian plant community. All of these strategies to alter planting densities in or near oak, aspen, cottonwoods, meadows, stream channels and seasonal wetlands would serve to retain and promote understory vegetation. In addition, 25 percent of tractor harvested units would remain unharvested, and would also remain unforested. Given all of the above, and the fact that only 38 percent

of the fire area on USFS lands would be artificially reforested, the enhanced floral resources created by the Eiler Fire would be retained throughout the majority of the fire area, and the burned area would still provide an abundance of floral resources for this species after project implementation.

As a cumulative effect, reforestation of private timber lands within the Eiler Fire perimeter is expected, which would generally use conventional means with inter-tree spacing generally tighter than what has been proposed by this project on USFS lands. In addition, private timber lands generally employ a greater array of tools in reducing competing vegetation than does the USFS, including the use of herbicides. Given more thorough salvage harvest which would result in a greater percentage of ground disturbed by machinery than on USFS lands, tighter spacing of planted trees, and potential use of herbicides to control competing vegetation, floral resources on the private lands burned by the Eiler Fire would be expected to be substantially less in both the short- and long-term than on burned USFS lands. However, because the importance of understory vegetation was considered in this proposed action, and a large component of this vegetation would be retained in both the short- and long-term, the reductions of this vegetation on private lands within the Eiler Fire area would not represent a substantive cumulative effect for bumble bee habitat on USFS lands.

As a result of analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 1 of the Eiler Fire Salvage and Reforestation may affect individuals of western bumble bee, but was not likely to result in a trend towards federal listing or loss of species viability.

**Alternative 2:** The Eiler Fire, by causing widespread mortality to forested stands, will result in a greater abundance and variety of flowering plants compared to what existed prior to the fire. This greater abundance and diversity in floral resources should benefit this species as well as other pollinator species. The No Action would not result in reforestation or site preparation activities that would reduce this vegetation within treatment areas, and due to the lack of reforestation, the understory response in the No Action would persist within all areas of the fire for a greater duration than compared to Alternative 1.

Cumulatively, actions such as personal-use fuelwood harvest would occur in the fire area, as would the felling of fire-killed trees when considered a hazard to safety, such as along roadways. Fuelwood gatherers may also remove logs that result from the felling of roadside hazard trees. Such actions may cause some disturbance to or reduction of non-coniferous vegetation within the fire area, but would be confined to specific sites, primarily along roadsides. Livestock grazing does not occur within the fire footprint and thus would not represent a cumulative effect. Cumulative effects of activities on private timber lands within the fire footprint would be as discussed under Alternative 1. There would be no substantive cumulative effects of these actions on western bumble bee habitat on USFS lands under this alternative.

As discussed in the Fire and Fuels Report for this project (Project Record), the resulting high snag densities and large numbers of down logs across the Eiler Project area under Alternative 2 would impede future fire line construction, increase safety hazards, and increase spotting potential in the event of

another wildfire. Resistance-to-control would be high within the first 10 years and extreme after 20 years. Increased flame lengths, fireline intensities, and resistance-to-control would be a direct result of fire burning in dead and down logs, branches, and shrubs. Fires burning in stands under 90th percentile weather conditions in the No Action Alternative would be expected to result in serious control problems. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Such fires could expand into private lands and the plantations that were planted as a result of the Eiler Fire, or expand outside the Eiler Fire footprint. Such fires would likely represent a benefit for this species and its habitat.

**Alternative3:** The potential for direct and indirect effects of this alternative to western bumble bees and their habitat would be similar to Alternative 2. The primary difference would be that hazard trees along roads would not only be felled, as in Alternative 2, but would also be commercially removed under this alternative. As such, disturbance to understory vegetation would be greater along roadside corridors due to the effects of logging machinery and the need for landings at which to process the harvested trees. This harvest of hazard trees would occur on approximately 1,095 acres of the fire area, or only about 7 percent of burned USFS lands. These are the only areas in this alternative in which the felling and or harvest of fire-killed trees would take place and no reforestation would occur in this alternative. Therefore, other than the removal of felled trees and the greater disturbance associated with removal, the rest of the effects are as discussed under Alternative 2. The lack of fuels reduction and resulting reburn potential would be as described under Alternative 2.

As a result of analyses of direct, indirect and cumulative effects, it was determined that the proposed activities within Alternative 3 of the Eiler Fire Salvage and Reforestation may affect individuals of western bumble bee, but was not likely to result in a trend towards federal listing or loss of species viability.

## Botanical Resources

One Forest Service Region 5 Sensitive plant species (*Pinus albicaulis*, whitebark pine) is known to occur within the Eiler Project area. In addition, the project area contains potential habitat for *Collomia larsenii* (talus collomia), although this species is not known to occur within the project area. No other currently listed Region 5 Sensitive plant species or federally listed plant species are known to occur or have potential habitat within the project area. Effects to Sensitive plant species are discussed in detail in the Biological Evaluation and Assessment for R5 Sensitive and Federally Listed Plant Species, Eiler Salvage and Restoration Project.

## **Alternative 1**

Although potential habitat for *Collomia larsenii* occurs within the project area, there are no known occurrences of this species within the project area. There would be no direct, indirect, or cumulative effects anticipated for *Collomia larsenii* and this species is not analyzed further within the effects section.

### **Direct, Indirect, and Cumulative Effects**

Area salvage activities, hand treatment activities, site preparation activities, and prescribed fire activities, including pile burning and underburning, all have the potential to directly affect plant species, resulting in death, altered growth, or reduced seed set through physically breaking, crushing, burning, scorching, or uprooting plants. Because ground-disturbing activities would be excluded from all occurrences of *Pinus albicaulis*, there would be no direct effects to this species from the implementation of Alternative 1 of the Eiler Project.

Because project activities would be excluded from the occurrence of *Pinus albicaulis*, there would be no anticipated project-related indirect effects to plant community composition. In addition, because the occurrence is largely surrounded by talus slopes and unburned mixed conifer forest, project-related salvage and fuels treatment activities adjacent to the occurrence would not be anticipated to alter the fire regime within the occurrence. There are no invasive plant species known to the vicinity of this occurrence, and therefore there would be no indirect effects from project-related changes to invasive plant distribution or spread that may affect *Pinus albicaulis*. As a result, no indirect effects are anticipated from the implementation of Alternative 1. Because there are no anticipated direct or indirect effects to *Pinus albicaulis* from the implementation of Alternative 1, there would be no cumulative effects to this species.

## **Alternative 2**

### **Direct, Indirect, and Cumulative Effects**

No direct or indirect effects to *Pinus albicaulis* would be anticipated from the implementation of Alternative 2. As a result, there would be no cumulative effects to this species from the implementation of Alternative 2.

## **Alternative 3**

### **Direct, Indirect, and Cumulative Effects**

Because hazard tree activities would occur as described for Alternative 1, direct and indirect effects to *Pinus albicaulis* would be as described for Alternative 1. As a result, there would be no cumulative effects to this species from the implementation of Alternative 3.

### **DETERMINATION**

With the incorporation of project Integrated Design Features, the implementation of Alternative 1 and Alternative 3 of the Eiler Project would have no effect to *Collomia larsenii* or *Pinus albicaulis*.

# Hydrology

The project area largely lacks stream channels and surface water due to the high porosity of the volcanic soils, presence of geologically recent lava flows, and fractured bedrock, and flow from these features lacks surface connectivity with any perennial streams. Where stream courses do exist, they are typically rocky, steep headwater ephemeral channels in volcanic talus on the slopes of Frenner Peak and Burney Mountain. Eiler Gulch is an incised, steep, seasonally flowing channel that only flows during spring snowmelt runoff or during high intensity precipitation events, ending on private land near the edge of a lava flow. The only perennial streams within the project area are Hat Creek and Honn Creek.

Wetlands on Forest Service lands within the analysis area total approximately 143 acres, according to the US Fish and Wildlife Service's National Wetlands Inventory (USFWS, 2014). These include freshwater emergent wetlands, shrub/forested wetlands, and freshwater lakes and ponds at Dutch Flat, Cornaz Lake, along Hat and Honn Creeks, and within the Thousand Lakes Wilderness.

## Alternative 1

### Direct and Indirect Effects

#### Stream Flow

Changes in flows would be the same as seen under the post-fire existing conditions due to the high degree of vegetation mortality from the fire. As only vegetation that is dead or dying would be removed in salvage and fuels treatments, the proposed actions would not directly affect flows as they would not change evapotranspiration for the project area.

Increased compaction and road-stream connectivity can increase runoff and raise peak flows. The one mile of new road construction and up to one mile of temporary road construction would not be located in an RCA with perennial streams, and would therefore have negligible effects to flows. Implementation of BMPs and adherence to wet weather soil moisture requirements would minimize project related compaction. Maintenance and repair on system roads to be utilized for the project will help disconnect stream, road connectivity, helping to lower peak flows in the project area. No measurable change to peak flows would be expected from road-related work.

#### Water Quality

The proposed action would not result in a measurable change to chemical constituents of streams that would affect water quality or beneficial uses because there are no proposed salvage activities or mechanical treatments within the RCAs of Hat and Honn Creeks. The main concern for chemical-related water quality degradation would be from machinery related fuel spills or fire related material; however, IDFs and BMPs are in place that would reduce risks of any of these concerns measurably affecting water quality.

Ash from pile burning material near streams can change the chemical properties of water if in sufficient quantities. The limited treatments in RCAs, and IDFs, as well as the lack of

mechanical fuels treatments adjacent to either perennial streams or seasonal streams with connectivity to downstream perennial waters, greatly reduces the risk of significant quantities of ash from pile burning eroding into streams and degrading water quality. A small unit of 6.6 acres in size (unit 103) is located within a portion of the Hat Creek RCA and is proposed for hand fuels treatments, including hand piling and burning. No ash from pile burning in this unit is expected to reach Hat Creek or negatively affect water quality due to the following factors: treatments are at least 100 feet away from the stream and across California State Highway 89, flat topography, and lack of a surficial hydrologic connection between this unit and the perennial stream. The increased groundcover produced by the project activities would aid in filtering out potential sediment from pile burning and mechanical salvage treatments before it reaches stream courses. Additionally, the risk of sedimentation to streams is very low due to the seasonal nature of streams within proposed mechanical salvage units, and lack of connectivity to downstream perennial waters.

All channels within salvage and fuels treatment units are seasonal in nature. Shading in these channel types has little influence on water temperature downstream, when elevated temperatures are most likely to occur in late summer and fall, due to the fact that these streams are no longer carrying water during that time of year. The proposed action would have a negligible risk of negatively affecting stream channel shade and water temperature in all project area streams. This assessment is based on the ephemeral nature of the streams in treatment areas, lack of shading due to post-fire conditions, types of treatment proposed within riparian areas, and number of RCA acres proposed for treatment along each stream. Riparian hand planting along Hat Creek may provide some additional future shade, but these effects are expected to be localized, as the scale of the planting would be too small to have a measureable effect to stream temperature.

Two water sources, Bidwell Pond and Boundary Camp, would be used. These water sources would be upgraded to meet BMP standards prior to use if they do not currently meet standards.

### **Channel Morphology**

There is very limited salvage proposed in the vicinity of stream channels. Hat and Honn Creeks, the only perennial channels within the project area, would not have any ground based mechanical treatments within their RCAs; therefore, no direct effects to Hat Creek are expected from this project. Hand planting of riparian plant species, such as willows, if needed, may help improve bank stability over time in localized areas on Hat Creek.

The only other channels within the Eiler Project area are seasonal or ephemeral, including Eiler Gulch, which lack surface connectivity to perennial waters and end in brush and basalt fields. No salvage is proposed within RCAs of ephemeral streams within the Inventoried Roadless Area, Thousand Lakes Wilderness, or on the flanks of Burney Mountain. There are ground-based salvage and mechanical fuels treatments proposed within the RCA of Eiler Gulch. IDFs, including a 10-foot no mechanical equipment

buffer, retention of bank stability trees, and large woody debris would help maintain channel stability. Best Management Practices would be used to design and locate skid trails and designated crossings to minimize erosion and sedimentation in these areas. No measureable effects to bank stability are expected due to the implementation of IDFs and BMPs, as well as the ephemeral, disconnected nature of channels within the treatment areas.

### **Riparian Areas, Wetlands, and Water Bodies**

Reforestation planting strategies would differ as well with no reforestation occurring within 50 feet of the meadow edge. This would allow for the regeneration of riparian vegetation, as well as minimize disturbance from site preparation for replanting of conifers. This would have the beneficial effect of aiding the redevelopment of riparian vegetation post-fire.

Along stream channels and seasonal wetlands with existing riparian communities burned by the fire, reforestation of conifer species would not occur within 20 feet of the riparian plant community. The proposed action under this alternative would provide for future woody debris recruitment for sediment trapping, additional ground cover, and habitat complexity within RCAs by retaining a minimum of one-to-two snags greater than 15 inches in diameter per 100 feet.

There would be hand planting of species such as willows and sedges in riparian areas affected by the Eiler Fire if it is determined that natural regeneration is not sufficient. This would have a localized beneficial effect by helping riparian communities reestablish more quickly post-fire.

The proposed new road construction would be used to access a plantation that burned near a fault escarpment, and would not occur in RCAs or adjacent to seasonal lakes and wet meadows.

## **Alternative 2**

### **Direct and Indirect Effects**

There are no direct effects of the “no action” alternative. Only previously identified past, ongoing, and future projects would take place within the sub-watersheds (see PORFFA, project record). Under the No Action alternative, none of the activities proposed under Alternative 1 would be implemented. Hazard tree felling could occur along roads currently open to the public, trails, and developed recreation sites. These hazard trees could be felled and left in place as part of road maintenance as per LRMP direction. The No Action alternative would not preclude activities already approved in this area or activities planned as separate projects. No fuels treatments, site preparation, or reforestation would occur.

## **Alternative 3**

### **Direct and Indirect Effects**

Because of equipment restrictions near streams, no direct or indirect effects to channel stability are expected to occur. Since the trees to be removed are dead or dying, no measureable effects to streamflow

are expected. Ground disturbance from roadside hazard removal would be relatively minimal, and since most roads proposed for hazard removal are not near stream channels, no measureable effects to water quality would be expected from this alternative. Additionally, an IDF would restrict equipment to the road prism when operating adjacent to ephemeral channels. An indirect effect of this alternative would be not reestablishing riparian vegetation. There would be no localized beneficial effects to riparian communities or channel morphology where riparian hand-planting may be needed.

### **Cumulative Effects - All Alternatives**

Cumulative watershed effects (CWE) include past, present, and reasonably foreseeable future ground disturbing activities within the analysis area. Cumulative watershed effects can occur on site or downstream of land disturbing activities. These effects may be either beneficial or adverse and result from additive changes in watershed structures and processes caused by multiple land management activities or natural events (such as wildfire) within a watershed. Changes in flow regimes, especially peak flows, and sediment introduced to streams can combine to upset the dynamic sediment transport/stream flow equilibrium conditions.

In addition, wildfires, as well as management practices, can alter soil condition. This may affect infiltration rates and increase the amount of compacted soils within a watershed. Modification of surface ground cover can also change run-off rates and erosion processes. All of these factors have the ability to create cumulative watershed effects. The use of BMPs and IDFs are tools to avoid adverse cumulative effects and to ensure that beneficial uses of water would be maintained.

Past activities include vegetation management, primarily in the form of timber harvest on both private and Forest Service lands, and wildfires, such as the Browns Fire in 2009. Ongoing activities include existing road infrastructure and related maintenance, fuelwood cutting, and dispersed and developed recreation. Salvage logging on private lands within the fire footprint began shortly after the fire ended in late 2014, and have continued into 2015. Foreseeable future activities include thinning, mastication, and fuels treatments within portions of the Whittington Forest Health Restoration Project that did not burn in the Eiler Fire.

### **Equivalent Roaded Acres**

The method used for quantifying cumulative watershed effects (CWE) is the Equivalent Roaded Acres (ERA) model, which was developed for National Forests in Region 5. Under this method, the watershed is rated by soils, streams, roads, fire history, and past activities and given a number showing susceptibility to adverse watershed effects from management activities. Proposed activities would also be rated to evaluate the effect of management activities on soil and water for each subwatershed. The ERA model of analyzing CWEs operates under several assumptions. These include that different types of management activities have different impact levels, watershed conditions recover from logging activities after 30 years, and fire activities recover after 10-to-15 years. While the contribution to ERA from the proposed actions is shown in 2015, in reality, treatments would likely occur in subsequent years, postponing some effects. A threshold of concern (TOC) is determined for each watershed based on a combination of management

direction, physiography, watershed sensitivity, land use history, and professional judgment. It does not represent the point at which watershed degradation will occur. It instead serves as an indicator of increasing risk for significant adverse cumulative effects to occur. The threshold of concern for all subwatersheds in the analysis area is 18 percent ERA. Choosing this TOC value allows CWE calculations to be consistent with TOCs used in previous Quincy Library Group projects nearby, including the Whittington Project, thereby facilitating comparisons between projects. The closer the calculated ERA value for the subwatershed is to the threshold of concern, the greater the chance of cumulative effects to the watershed and downstream beneficial uses. The effect of past activities decreases overtime although the contribution of permanent roads to ERA does not change over time. Table 12 provides information regarding the cumulative watershed effects using equivalent roaded acres for each of the 6th field watersheds for pre- and post-fire existing conditions.

**Table 12. Pre- and post-fire existing condition Equivalent Roaded Acre (ERA) values for all project alternatives and subwatersheds**

6th Level Subwatershed (HUC-12)	Watershed Size (Acres)	Threshold of Concern (ERA%)	Pre-Fire Existing Condition			Post-Fire Existing Condition		
			ERA	ERA%	ERA% as % of TOC	ERA	ERA%	ERA% as % of TOC
Burney-Burney Creek	23,452	18	1587	<b>6.4</b>	36	1715	<b>7</b>	39
Eiler Gulch	27,645	18	1943	<b>7</b>	39	5800	<b>21</b>	117
Lower Hat Creek Valley-Hat Creek	33,584	18	1216	<b>4.4</b>	24	1579	<b>5.7</b>	32
Thousand Lakes	12,406	18	589	<b>2.1</b>	12	797	<b>2.9</b>	16
Upper Hat Creek Valley-Hat Creek	20,990	18	477	<b>1.7</b>	10	1413	<b>5.1</b>	28

**Source: Lassen National Forest (LNF) Geographic Information Systems (GIS) data and US Geological Survey Watershed Boundary Dataset (2012).**

Table 13 provides a summary of ERA values under each alternative for the Eiler Project. All 6<sup>th</sup> field subwatersheds, with the exception of Eiler Gulch, are considered low risk for cumulative watershed effects under each alternative. This is because smaller proportions of these watersheds burned, and few activities are planned within these watersheds. The Eiler Gulch subwatershed is over threshold and considered to be at high risk of cumulative effects under every alternative, which is primarily due to the large percentage of watershed area (over 45%) at moderate-to-high severity in 2014, and the post-fire salvage activities conducted on private lands.

Overall, the change in condition of the watersheds from the project would be negligible. Despite the high risk reflected in the ERA model for the Eiler Gulch subwatershed, activities associated with this project would be unlikely to affect downstream beneficial uses for the following reasons: there is no connectivity of channels within treatment units of the Eiler Gulch subwatershed with perennial streams, and surface flow of the seasonal channels ends in brush or basalt fields. Therefore, no effects to downstream

beneficial uses would be expected from the project. The ERA percentages decrease as watersheds recover from the fire and harvest effects. By 2020 (five years after the fire) all watersheds are below threshold, and by 2025 (ten years after the fire) all would be considered at low risk of CWE. Alternative 1 is consistent with all other management direction concerning soils, fisheries, and hydrology.

**Table 13. Summary table of ERA values for each alternative in the Eiler Project.**

6th Level Subwatershed (HUC-12)	1 Year (2016)			5 Years (2020)			10 Years (2025)		
	ERA	ERA%	% of TOC	ERA	ERA%	% of TOC	ERA	ERA%	% of TOC
<b>Alternative 1 – Proposed Action</b>									
Burney-Burney Creek	1662	<b>6.7</b>	37	1288	<b>5.1</b>	29	946	<b>3.7</b>	21
Eiler Gulch	7161	<b>25.9</b>	144	4942	<b>17.9</b>	99	2275	<b>8.2</b>	46
Lower Hat Creek Valley	1684	<b>6.1</b>	34	1123	<b>4.1</b>	23	647	<b>2.3</b>	13
Thousand Lakes	784	<b>2.8</b>	16	504	<b>1.8</b>	10	285	<b>1.0</b>	6
Upper Hat Creek Valley	1506	<b>5.4</b>	30	1024	<b>3.7</b>	21	484	<b>1.8</b>	10
<b>Alternative 2 – No Action</b>									
Burney-Burney Creek	1623	<b>6.6</b>	37	1215	<b>4.8</b>	27	839	<b>3.2</b>	18
Eiler Gulch	5680	<b>20.5</b>	114	3791	<b>13.7</b>	76	1592	<b>5.8</b>	32
Lower Hat Creek Valley	1475	<b>5.3</b>	29	1014	<b>3.7</b>	21	586	<b>2.1</b>	12
Thousand Lakes	741	<b>2.7</b>	15	495	<b>1.8</b>	10	281	<b>1.0</b>	6
Upper Hat Creek Valley	1375	<b>5</b>	28	929	<b>3.4</b>	19	448	<b>1.6</b>	9
<b>Alternative 3 – Roadside Hazard Removal Only</b>									
Burney-Burney Creek	1623	<b>6.6</b>	37	1216	<b>4.8</b>	27	839	<b>3.2</b>	18
Eiler Gulch	5930	<b>21.5</b>	119	3955	<b>14.3</b>	79	1713	<b>6.2</b>	34
Lower Hat Creek Valley	1603	<b>5.8</b>	32	1058	<b>3.8</b>	21	612	<b>2.2</b>	12
Thousand Lakes	774	<b>2.8</b>	16	497	<b>1.8</b>	10	282	<b>1.0</b>	6
Upper Hat Creek Valley	1360	<b>4.9</b>	27	911	<b>3.3</b>	18	438	<b>1.6</b>	9

Source: LNF GIS

## Soils

### Alternative 1

#### Direct and Indirect Effects

Ground-based mechanical treatments have the potential to cause detrimental disturbance to soil in the post-fire environment. On-site direct effects from the proposed action are expected to be minimal with the

project IDFs in place. The potential for activities to generate additional soil cover in the form of woody debris in areas with moderate and high soil burn severity is considered a net benefit for burned areas, but the loss of vegetation resulting from mechanical operations is a detriment.

Ten years of soil monitoring on the forests of the Herger-Feinstein Quincy Library Group (HFQLG) pilot project (which includes the Lassen NF) have demonstrated the effectiveness of Forest Service implementation methods in preventing detrimental soil effects resulting from vegetation management activities in the Northern Sierra Nevada and Southern Cascades. Similarly, Best Management Practices (BMP) monitoring during the same period have demonstrated that the Lassen has been highly effective in its protection of soils and water quality through proper implementation of BMPs (HFQLG, 2011).

Soil erosion and impaired hydrologic function have a general potential to create indirect effects. Indirect effects of erosion and compaction are off-site effects upon watershed hydrology and/or water quality. Damaged soil hydrologic function, via compaction, can lead to increased runoff, which can affect the quantity, timing, and flashiness of stream flows during precipitation events. The direct effects associated with proposed activities are expected to be minimal, so indirect effects would be accordingly quite minimal.

### **Cumulative Effects**

The cumulative effects assessment area for the soil resource is bounded in space within the proposed activity area, because this is where the full extent of soil disturbing activities takes place. Ground-based mechanical vegetation management activities have occurred within the Eiler project area over the past decades. Future ground disturbing activities include the activities planned in the Eiler Project proposed action. Although there are other ongoing and planned future activities in the Eiler Project area, none of these projects will take place where ground-disturbing activity in the Eiler Project will occur. So the only reasonably foreseeable future ground-disturbing activities in the Eiler activity units are the Eiler activities themselves.

In improving soil cover for areas currently lacking it, there will likely be a net benefit in reducing overall erosion potential within the project area, while soil productivity and hydrologic function are maintained.

The proposed action will not produce any significant amount of adverse direct or indirect soil impacts. Therefore, the proposed action in combination with past, ongoing, and reasonably foreseeable future actions will not produce adverse cumulative effects to the soil resource.

## **Alternative 2**

Direct effects of the No Action alternative would be of no effect on the soils, as soil disturbing project activities would not take place. Roadside hazard trees could be felled by hand and left in place. Soil cover for erosion protection would gradually increase as low-growing plants establish and spread. Debris from dead trees would gradually fall and provide some soil cover. Present compaction levels and soil hydrologic function would remain unchanged. Organic matter dynamics and nutrient cycling would

continue to recover naturally, once vegetation becomes re-established. Some areas will be left lacking surface cover, while other areas will have high concentrations of fuels for the next fire.

Indirect effects of the No Action alternative would be the continued short-term erosion, particularly for areas with moderate and high soil burn severity, until hydrophobicity diminishes and vegetation cover recovers. In the long term, areas with moderate and high soil burn severity would have high fuel loadings into the near future, with a corresponding elevated hazard of detrimental soil effects in the event of wildfire.

### Alternative 3

This alternative would treat much less land, 1095 acres, with only mechanical harvest and no follow-up mechanical fuels treatments or reforestation. The effects on those areas treated would be the same as discussed under Alternative 1, Area Salvage Harvesting and Hazard Tree Removal, except without the mechanical fuels treatment effects. The lands left untreated would recover naturally with the effects discussed above in Alternative 2.

## COMPARISON OF ALTERNATIVES

First-year post activity erosion could be slightly elevated in Alternative 1 due to ground disturbance, while erosion in the subsequent two to four years may be slightly higher for Alternatives 2 and 3 without the benefit of enhanced soil cover. However, absolute differences would be negligible given the scale of fire effects.

**Table 14. Eiler Comparison of Alternatives**

	Alt 1	Alt 2	Alt 3
	Acres		
Ground-based salvage	2,567	0	0
Mechanical hazard tree removal	1,174	0	1,095
Follow up mechanical fuels treatment	3,741	0	0
Fuels treatment only	517	0	0
Helicopter salvage	481	0	0
Baker Cypress treatments	361	0	0
Hand hazard tree felling*	0	1,095	0
Hand fuels treatments	3,602	0	1,095
Windrow spreading	277	0	0
Reforestation	5,645	0	0

\*Potential, outside of Eiler Project decision

Future high-intensity fire hazard due to unburned fuels in the Eiler Fire area represents a threat to soil resources within the project area. The removal of future fuels through harvest and through piling and burning of woody debris will reduce that risk. Alternatives 2 and Alternative 3 would do little to alleviate the hazard.

The Eiler Fire caused large scale soil disturbance and pulse erosion, albeit natural, with consequential impacts to soil productivity and water quality. The Eiler Project has little potential to create impacts of a degree or extent to consider detrimental or adverse to the soil resource. The main potential soil impact is for erosion exceeding the natural rate. However, soil cover in the form of project-generated woody debris and project integrated design features will prevent that from occurring. The proposed action would remove approximately 5 acres of productive soils due to road construction. It would restore soils that were detrimentally impacted by windrowing in the past, a benefit to soil productivity on over 277 acres.

## **Cultural Resources**

### **Alternative 1**

Fifteen historic properties have been identified within the project area; some sites are located in more than one treatment area. Thirteen sites are located in areas proposed for Area Salvage Harvesting. Eleven sites are located in areas proposed for mechanical fuels treatments and one site is located in an area proposed for hand fuels treatment. Ten sites are located in areas proposed for conventional reforestation and five sites are located in areas proposed for natural regeneration. Five sites are located in areas proposed for roadside hazard tree removal. Standard Resource Protection Measures (SRPM) would be employed as integrated design features and applied to all cultural resources within the project area for all of the alternatives. Application of SRPMs would eliminate any adverse effects to cultural resources. This undertaking would be consistent with stipulations in the *Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation*.

### **Indirect Effects**

Some of the treatments could enhance cultural resource values, even if they do not directly affect the landscape within the site boundary. Treatments outside of site boundaries could have a beneficial impact on cultural resources. If a fire-killed tree falls into a site it could potentially damage cultural resources; therefore, removing it before it falls would be a proactive protection measure for historic properties. Fire killed and fire injured trees would be removed before they could possibly fall onto historic sites and harm cultural resources. One issue with removing trees around historic sites is that the sites themselves become more visual in the landscape, especially when they have been flagged for avoidance during the project work. Flagging of historic sites provides them protection as they are treated as no entry zones. However, the same flagging can also draw unwanted attention to the sites. It is possible that flagged sites are more susceptible to looting than those sites that have not been flagged. Also, burning natural and activity-generated fuels surrounding historic sites will reduce fuel loading which would decrease the potential for a high intensity fire burning through the site again. Reforesting will change the visual character of the sites; the new planted trees will obviously not be located in the exact location of the fire damaged trees.

However, it is likely that many fires have occurred in this area and the proposed reforestation will just be another chapter of the ever changing landscape.

## **Alternative 2**

### **Direct and Indirect Effects**

In an effort to minimize further impacts to the sites, the hazard trees should be felled away from sites. The risk of cultural resource damage may be higher should the “No Action” alternative be selected due to trees falling into the sites. Also due to the lack of fuels treatments, fuel loading may occur adjacent to sites. This option would not provide opportunities for study and interpretation.

### **Cumulative Effects**

Without management intervention there is a concern that falling trees and fuel loading in and around historic properties would lead to a loss of historic integrity of the site. While the loss of historic integrity may not be great, it still is important to mitigate issues that may affect the site’s eligibility for the NRHP.

## **Alternative 3**

Five sites are located in areas proposed for roadside hazard tree removal. Standard Resource Protection Measures would be employed as integrated design features and applied to all cultural resources within the project area for all the alternatives. Application of SRPMs would eliminate any adverse effects to cultural resources. This undertaking would be consistent with stipulations in the *Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation*.

### **Direct and Indirect Effects**

Hazard trees may be removed within sites following the guidelines discussed in the hazard tree effects section of this report. In an effort to minimize further impacts to the sites, no piling or burning is allowed within sites. No adverse effects from project related activities would occur to cultural resource sites as a result of implementing this alternative. The risk of cultural resource damage may be higher should this alternative be selected due to trees falling into the sites. Also due to the lack of fuels treatments, fuel loading may occur adjacent to sites. This option would not provide opportunities for study and interpretation.

### **Cumulative Effects**

Without management intervention there is a concern that falling trees and fuel loading in and around historic properties would lead to a loss of historic integrity of the site. While the loss of historic integrity may not be great, it still is important to mitigate issues that may affect the site’s eligibility for the NRHP.

## **Transportation**

### **Alternative 1**

Activities with potential to affect the existing transportation system include proposed new road construction (addition of existing non-system route as a NFS road), temporary road construction and decommissioning, road maintenance, and increased traffic.

#### **Direct Effects**

For the short term during the sale contract, depending on the length and timing of the project, there will be potential for erosion from the construction of a new NFS road and temporary roads. There will be standard provisions in the contracts to require erosion control measures in case seasonal closures are needed. For the long term, temporary roads will be decommissioned after haul operations or post sale activities are completed.

In the short term, there will be a direct effect of increasing traffic due to the movement of equipment, materials, and personnel into and out of the project area. Increased traffic can impact the safety of the public and employees using the roads in the area. Traffic management measures will minimize these impacts. With the use of standard contract provisions for traffic control, effects will be negligible.

#### **Indirect Effects**

A well-managed and maintained road system provides for safe and efficient public access and firefighter safety. The road maintenance activities and hazard tree removal proposed will improve both public access and firefighter safety.

#### **Cumulative Effects**

All past actions have led to the existing transportation system which includes county roads, NFS roads, non-system routes on NF lands, and roads located on private lands which are owned and operated by timber management companies. Active management of the transportation system will improve public access and firefighter safety, as well as minimize adverse environmental effects and reduce future maintenance costs.

### **Alternative 2**

#### **Direct, Indirect, and Cumulative Effects**

Under this Alternative, no treatments will be performed and the existing road system within the project area will remain as is. There will be no direct or cumulative effects. National Forest System roads may need to be closed for public safety due to numerous snags that will pose a danger to users if not removed. Without any planned hazard tree removal, these roads will effectively close to public and administrative use though the large accumulation of potential tree fall. Without access for maintenance, some of these

roads could possibly deteriorate to the point where they will no longer be accessible to high clearance vehicles, including fire suppression equipment. This will limit ingress/egress for firefighting ground resources and will therefore reduce firefighter safety.

### **Alternative 3**

Effects to the transportation system for Alternative 3 would be the same as those described in Alternative 1 above.

## **Recreation and Visual Resources**

### **Alternative 1**

#### **Direct & Indirect Effects**

##### **Recreation Areas/access**

Effects for recreation are generally localized to specific areas during the implementation time frame so changes in the overall ability for the public to participate in recreation opportunities are considered to be minor. Access along roads and trails may be interrupted or delayed for brief periods during implementation of the proposed treatments, most notably during tree removal. Public use may be limited if short term closures occur. No recreation facilities are proposed to be closed as a result of this alternative so overall opportunity is unaffected and no long term effects are anticipated.

Smoke, dust, and heavy equipment used in mechanical treatments may temporarily affect the sights, sounds, smells, and other physical and social qualities (collectively hereafter, qualities) that make recreation areas/routes desirable for use. Contractors and Forest Service personnel working in the vicinity may detract from the sense of separation or solitude, but no more so than the loss of cover resulting from the fire. Hikers and dispersed campers may find these conditions amplified by their extended residence time within the project area. Overall, these effects are considered short term and do not represent the finished project which is a mosaic of treatment and non-treatment areas leading to a diverse and reforested landscape.

It is unlikely that hunting and wildlife viewing opportunities will be affected by implementation. Lack of vegetation and cover, as a result of the fire, has displaced many popular game species including bear and deer. These species will likely return over time as grasses, forbs, and brush regrow. Reforestation will speed up the recovery time for cover provided by large-tree canopy. Utilization of multiple reforestation methods will result in a diversity of canopy structures which may actually increase wildlife encounters.

##### **Wilderness**

Hazard tree felling improves the safety conditions along trails. Implementation of this treatment may temporarily affect wilderness users. Trail access may be impaired by delays or closures during felling operations. The sense of solitude or other qualities may be temporarily diminished by the sights, sounds,

and additional personnel in the area during treatment. The residual stumps may affect the primitive experience, but a more natural appearance will begin to return in these areas as post-fire vegetation regrows. These effects are considered to be short term in nature and will result in safe and effective access through the wilderness, both for the public and emergency personnel. During treatment, Wilderness will be accessible by the three other trails into the area.

### **Transportation**

Several primary and secondary routes pass through or are in direct proximity to treatment areas. The proposed treatments should have no effect on the amount of recreation opportunities available in the long term, but can have effects on the quality of experience for some Forest visitors in the short term. Temporary road closures, re-routing, smoke, noise and fugitive dust are some of the short term effects that can be anticipated.

There are two primary access routes for the recreation area, including NFS 34N19 (26 Road) and 33N25. The 26 Road provides the main access through the Project area and serves as the Lassen Backcountry Byway. NFS 33N25 is the only road to the Tamarack Trailhead. Removal of hazard trees will improve public safety and reduce instances of blocked routes due to fallen trees. Treatment of activity-generated surface fuels will reduce the risk of subsequent wildfire starts from the roadway. These routes would be used both for haul and to transport personnel and equipment into treatment areas. Although a dust abatement plan is in place for this alternative, fugitive dust and increased traffic could be a concern for motorists and pedestrians recreating in the area.

The proposed new road construction is over ½ mile from the Wilderness boundary and approximately two miles from the Tamarack Trailhead. It is blocked by visual barriers from both locations. Sounds of road construction may be perceived, but, such effects are expected to be minimal and short term in nature. Heavy equipment used during the proposed construction and decommissioning of roads may temporarily affect the qualities that make recreation areas and routes desirable for use.

Approximately 2.4 miles of existing non-system road would be upgraded to standard and added to the NFS system as ML2 roads. These routes are currently closed to motor vehicle use. Reclassification of these roads would increase the recreation opportunity by adding them to the NFS system. Equipment used during the proposed upgrades may temporarily affect the qualities that make nearby recreation areas and routes desirable for use.

### **Visual Resources**

Approximately 75 percent of the Eiler Fire burned under moderate or high severity. In high severity burn areas, the landscape has been dramatically altered. The general character of the land has changed to fire-killed trees interspersed with rock outcroppings and patches completely denuded of vegetation. Reforestation of severely burned areas would expedite the re-establishment of forested areas, improve visual quality, and provide a mixture of vegetation types and age classes. By treating the slash and surface fuels through piling and burning, vegetation would occur that provides visually pleasing contrast to

surrounding features and landforms. The overall result of the proposed treatments would be an improved visual quality.

The majority of what can be perceived as negative effects to the visual resource occurs during implementation. While the treatments are being carried out, control lines, treatment edges, ground disturbance, and untreated slash can be anticipated. Scenes during this initial implementation phase do not represent a completed treatment; effects to scenic quality are based on completed treatments. This initial appearance is short term in duration. At the conclusion of treatment, visual signs of activity (i.e., cut stumps or track and tire marks on the ground) are not anticipated to remain characteristic to the landscape. Evidence of burning on remaining trees and various ground features may be prevalent, but such sights are naturally occurring in forests where wildfire regimes are common. Some plantation treatments may include spreading of the soils in the windrows. Although this portion of the treatment may incur additional disturbance in the short term, removal of the windrows will restore the natural landscape, improving long term visual quality. When growth of shrubs, grasses, and forbs is underway, the majority of evidence left behind by management activities is not anticipated to be evident to the casual forest visitor.

Hazard tree removal treatments that occur throughout the project area will alter the appearance of the immediate foreground. Stumps will be visible initially, but will become less obtrusive as “green up” occurs. Reforestation along the roadways would be consistent with the surrounding areas to blend treatment lines from the fore to middle ground.

### **Cumulative Effects**

Although there may be some decrease in use in the short term, recreation activities would likely continue in the Project area. The management activities proposed under this alternative, along with those already listed under the Connected Actions listed above, would result in some short term effects of noise, traffic, and smoke associated with treatment activities. Some temporary and short-term displacement of recreationists during the time when treatment occurs can be anticipated. Standards and guidelines are in place to minimize effects of the project on recreation and scenic resources.

Salvage treatments have begun on private lands within the Project area. Increased traffic, noise, smoke, and fugitive dust are currently present in the area, but, due to the season, are causing only minimal disturbance to recreationists. Private salvage and clean-up activities will likely be completed before the Eiler Project would be implemented.

Clean-up activities on private lands have made an impact to the visual landscape within the Eiler Fire perimeter. Property boundary lines are clearly visible and treatment lines are starkly evident. To the casual observer, NFS lands appear unkempt and neglected. The proposed treatments in the Eiler Project would dramatically improve the visual scenery and blend lines between property ownerships.

Vegetation treatments and the transportation activities associated with this Project as well as past, present, and foreseeable activities already listed would have no significant cumulative effects to recreation resources and overall recreation opportunities. Effects from the proposed treatments, especially since they vary in size and space and occur within a disturbed area, will seem minimal in comparison to the disturbance of the Eiler Fire itself. Over the long term, the proposed treatments will improve the visual impacts from the fire as well as restore some of the natural characteristics that were affected by past treatments.

## **Alternative 2**

### **Direct & Indirect Effects**

#### **Recreation Areas/access**

Under the no action alternative, hazard trees representing an imminent threat along roads and trails could be felled for public safety as directed in the LRMP (4-24 – 4-25). Due to the sheer number of roadside hazard trees and the amount of available personnel, safety road closures may be put in place until hazards can be removed. Downed trees may partially or fully block roads. This would reduce or deny access for hunting, camping, hiking, and firewood cutting. Blocked routes may encourage cross-country travel and resource damage as vehicles attempt to drive around the blockages. Pedestrians and equestrians may move farther into unsafe, burned areas to circumvent downed trees.

Salvage harvest, fuels treatments, and reforestation would not occur in Alternative 2 and would not change the present road related experience (i.e., access or opportunity for driving). Users would continue to see blackened and fire-killed trees and areas of charred ground denuded of vegetation. Distinct treatment lines between NFS and private lands would continue to exist. The characteristics of past treatments (i.e. windrowed plantations) would still be visible. The physical experience of the post-fire environment would remain unchanged. Existing ground fuels along with those associated with the cut trees would continue to accumulate along the roadway. The potential for subsequent fires would be increased. Some wildlife encounters may decrease due to the longer replacement time for conifers. Due to the number and proximity of fire-killed trees, campers may be displaced to meadows and open areas. This may result in additional resource damage from trash, waste, and compaction. Instances of encroachment into wetlands by OHVs may increase.

Some uses may decrease under this alternative. In studying the effects of fire on recreation demand in Montana, Hesseln, Loomis, and Gonzalez-Caban (2004) found a slight decrease in hikers' demand in areas recovering from crown fire and also found that as burned area increased and the amount of burned area viewed increased, recreation demand decreased, suggesting that the size and extent of burns affect visitation. Taylor and Daniel (1984) found that camping was the recreational activity most affected by severe fire, while hiking and nature study were less affected by severe fire.

#### **Wilderness**

Effects to the Thousand Lakes Wilderness, in this alternative, are the same as in Alternative 1.

#### **Transportation**

In this Alternative, no roads will be constructed or added to the transportation system. There would be no changes to access. There would be no road maintenance outside that which is regularly scheduled.

### **Visual Resources**

Alternative 2 would result in no immediate change to the existing condition. Swathes of blackened and fire-killed trees would remain in the fore and middle ground. No variations in treatment would occur except at NFS boundaries. The changes in those areas would continue to show noticeable treatment lines. Windrows would not be removed. Untreated areas and debris may delay natural regeneration of vegetation and would increase the potential for subsequent fires.

### **Cumulative Effects**

Past and future fuels and vegetation management directly affect recreation use during the time of implementation, but are generally considered to be short term in duration. Access may be temporarily suspended or delayed and the qualities favorable to the recreation and visual scenery may be affected during implementation. Road maintenance activities have the potential to limit access at the time and place they occur, but overall, are beneficial to recreation in the access they provides and user comfort they bring to the driving and sight-seeing experience. Wildfires can affect scenery resources for years into the future depending on soils, aspect, and vegetation species composition. A study by Vaux, Gardner, and Mills (1984) on the impact of fire on forest recreation suggests that higher intensity fires had negative effects on recreation values, but also caution that the impact of fire was not always negative among their respondents, and preferences of recreationists change over time.

## **Alternative 3**

### **Direct & Indirect Effects**

#### **Recreation Areas/access**

Effects for recreation are generally localized to specific areas during the implementation time frame, so changes in the overall ability for the public to participate in recreation opportunities are considered to be minor. Access along roads and trails may be interrupted or delayed for brief periods during implementation, most notably during tree removal. Public use may be limited if short term closures occur.

Smoke, dust, and heavy equipment associated with hazard removal may temporarily affect the qualities that make recreation areas/routes desirable for use. These effects are considered short-term in nature and will result in safer roads and trails. Removal of larger trees will reduce the amount of fuel on the ground, thus decreasing the chance of future roadside fire starts.

#### **Wilderness**

Effects to Wilderness are consistent with Alternatives 1 and 2.

#### **Transportation**

Effects from transportation would be the same as in Alternative 2. Removal of hazards will improve public safety and reduce instances of blocked routes due to fallen trees.

### **Cumulative Effects**

Although there may be some decrease in use in the short term, recreation activities would likely continue in the Project area. The management activities proposed under this alternative would result in some short term effects of noise, traffic, and smoke associated with treatment activities. Some temporary and short-term displacement of recreationists during the time when treatment occurs can be anticipated.

Noise, smoke, fugitive dust, and increased traffic associated with salvage activities on private lands are causing only minimal disturbance to recreationists. Current use is mostly by those cutting firewood and those curious of the fire damage. Private salvage and clean-up activities will likely be completed before the Eiler Project would be implemented.

Transportation activities associated with this Project as well as past, present, and foreseeable activities already listed would have no significant cumulative effects to recreation resources and overall recreation opportunities.

## Summary Comparison of Alternatives

Alternative 1 was developed to address all components of the Purpose and Need as outlined in Chapter 1 of this document. These desired conditions include:

1. Forest lands and a transportation system free of fire-affected trees or other hazards in areas of high public and administrative use;
2. Economic value of forest products recovered in a manner beneficial to local communities and forest management;
3. Surface fuel load levels that minimize high-intensity, large-scale fires within forest stands, while maintaining snags for wildlife habitat;
4. Landscapes dominated by site-appropriate trees with variable densities that contribute to a fire resilient landscape and structures that provide diverse wildlife habitat and forest products; and
5. Ecological services that provide wildlife habitat and production of food, regulation of carbon sequestration and decomposition, support for nutrient cycling, and improvements to recreational benefits and aesthetics.

Alternative 3 was developed based on scoping comments to address safety hazards along forest roads. Table 15 below compares acres treated and how each responds to the desired conditions of the Purpose and Need for the Eiler Project.

**Table 15: Comparison Alternatives for the Eiler Project**

	Desired Condition Met	Alternative 1	Alternative 2	Alternative 3
Roadside Hazard Trees	1, 2 <sup>a</sup> , 3	1,174 acres	0 acres	1,095 acres
Area Salvage	1, 2, 3	3,048 acres	0 acres	0 acres
Volume removed	2, 3	141,402 GT	0 GT	26,637 GT
Area Fuels	1, 3	4,119 acres	0 acres	0 acres
Artificial Reforestation	4, 5	5,645 acres	0 acres	0 acres

<sup>a</sup>when removed in Alternatives 1 and 3

## **Appendix A: Additional Maps**

Additional maps are located at: <http://www.fs.usda.gov/projects/lassen/landmanagement/projects>

Map 1 – Eiler Fire Salvage and Restoration Project, Alternative 1, Project Areas Map

Maps 2-9 – Eiler Fire Salvage and Restoration Project, Alternative 1, Areas 1-8

Map 10 – Eiler Fire Salvage and Restoration Project, Alternative 3